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NEARCTIC SAWFLIES
IV. ALLANTINAE:
ADULTS AND LARVAE
(HYMENOPTERA:
TENTHREDINIDAE)

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UNITED STATES
DEPARTMENT OF
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TECHNICAL
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NUMBER 1595

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NEARCTIC SAWFLIES IV. ALLANTINAE: ADULTS AND LARVAE (HYMENOPTERA: TENTHREDINIDAE)

BY DAVID R. SMITH



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NEARCTIC SAWFLIES

IV. Allantinae: Adults and Larvae (Hymenoptera: Tenthredinidae)

By DAVID R. SMITH, *entomologist*¹

Abstract

The sawfly subfamily Allantinae is revised for North America. Sixty-four species, 15 genera, and 3 tribes are characterized including species from Mexico and Guatemala, which are southern extensions of northern genera. Larvae of Allantinae species feed on the foliage of wild and cultivated roses, strawberries, dogwood, willow, alder, walnut, and other plants, and some bore into wood and apples. Keys to genera and species are given for adults and larvae if known. For each species, descriptions of the female, male, and larva are given as well as illustrations of important morphological structures, literature citations, data from type-specimens, distributional data and maps, recorded hosts, biological information, and discussions. The following new genera and species are described: *Empria eosa*, n. sp., *Phrontosoma brocca*, n. sp., *P. usta*, n. sp., *Haymatus blassus*, n. gen., n. sp., *Ametastegia beca*, n. sp., *A. rocia*, n. sp., *A. xenia*, n. sp., *Somanica occua*, n. gen., n. sp., and *Allantus rahmus*, n. sp. In addition, there are 10 new synonymies, 1 new combination, and 1 new status.

Introduction

The subfamily Allantinae, as defined in this bulletin, includes 64 species divided into 15 genera and 3 tribes for North America south to Guatemala. The importance of these sawflies is evidenced by the numerous notes and articles on various species in the earlier literature, primarily those damaging birch, dogwood, cultivated strawberries, apples, roses, and violets. All larvae are external

¹ Systematic Entomology Laboratory, Science and Education Administration, c/o U.S. National Museum, Washington, D.C. 20560.

feeders on the foliage of the host. Five species are known to feed on *Fragaria*, five on *Cornus*, five on *Rosa*, and other species on *Salix*, *Castanea*, *Rubus*, *Alnus*, *Quercus*, *Rumex*, *Prunus*, *Amelanchier*, *Viola*, *Cephalanthus*, and *Lysimachia*. Larvae of some species are destructive not only to the plant on which they feed but also to the substance in which they bore to form a pupal cell. These secondary hosts, as I am calling them, include apples and other fruits, berry canes, and even structural wood. Damage to the secondary hosts, however, is purely incidental and depends on the proximity of the secondary host to the host plant or primary host on which the larva actually feeds.

This bulletin brings together the information on the North American Allantinae and provides a means for identifying the adults and larvae. Distributions, biological notes if known, and citations to previous works are given for each species. More detailed information may be found in the Literature Cited section, which contains most of the pertinent literature on this subfamily.

Because few species are known from Mexico and Guatemala, and all of them represent southern extensions of northern genera, I have included descriptions of them also. In South America only four genera are known, which are included in the key to genera; consequently, this key is valid for the New World. The South American genera *Antholcus* Konow, *Probleta* Konow, *Proto-probleta* Malaise, and *Acidiophora* Konow are not treated further. These genera have been revised elsewhere: *Probleta* and *Proto-probleta* by Malaise (1949),² *Antholcus* by Smith (1973b), and *Acidiophora* by Smith (1927b).

The most significant works on this subfamily are those by Ross on *Empria* Lepeletier (1936) and *Allantus* Panzer, *Ametastegia* A. Costa, and *Aphilodyctium* Ashmead (1937a). Ross clarified the previous work on these groups and gave keys to the Nearctic species. He dealt with over a hundred names and reduced them to a few valid species. Earlier workers described a myriad of forms most of them based on radical color variations in many of the species. For example, MacGillivray described 101 species in this subfamily, of which only 3 are not in synonymy. Outside of Ross' studies and his key to genera (1937b), the literature on this subfamily is scattered. Species have been placed under various names because the taxonomy has changed so much since the early 1900's, and one must be careful in interpreting this early literature to determine to which species the articles refer.

² The year in italic after the author's name refers to Literature Cited, p. 153.

In the early 20th century, the Allantinae were known as the Emphytinae, based on the genus *Emphytus*, which is now a synonym of *Allantus*. *Emphytus* was considered a junior synonym long before 1961, and the name was changed to Allantinae, which has been used for over 40 years. Accordingly, the name Allantinae, which has been generally accepted, is being maintained in the interest of stability. As with higher classifications, the subfamilial concept of authors has differed. For example, Malaise (1963) included most genera in the Selandriinae, and Benson (1952) included all genera in several tribes in the Blennocampinae. I regard the Allantinae as a small, easily recognizable unit, the same as that differentiated by Ross (1937b, 1951), and separated from other subfamilies by the venation of the forewing. Adults may be keyed to this subfamily by using Ross' (1937b) key to the subfamilies of Tenthredinidae. Adults of the Allantinae have similar forewing venation (pl. I, 32, 33): Veins *M* and *1m-cu* parallel; veins *M* and *Rs + M* meeting *Sc + R* at or very near the same point; vein *2r* present; and vein *2A + 3A* complete, always separated from *1A* by an anal crossvein.

The New World genera of Allantinae fall into four groups, which are here given tribal names, the Eriocampini, Emprini, Allantini, and Acidiophorini. These tribes coincide with those separated by Benson (1952), who included them in the Blennocampinae.

(1) **Eriocampini**.—Mandibles similar, each bidentate, or left mandible with small tooth near base and right mandible unidentate; clypeus shallowly emarginated; propleurae truncated on meson; in forewing, vein *M* meeting vein *Sc + R* slightly basad to point where vein *Rs + M* meets *Sc + R*; mesopleurae with deep, coarse, closely set punctures. The wing venation, unique for this tribe, approaches that of the subfamily Tenthredininae (Benson, 1959), in which vein *M* meets *Sc + R* far basad to the point where vein *Rs + M* meets *Sc + R*. The venation, however, is closer to that of the Allantinae as here defined.

(2) **Emprini**.—Mandibles similar, each bidentate; clypeus normally shallowly emarginated, sometimes with median tooth or keel; propleurae varying from truncated to acute on meson; in forewing, veins *M* and *Rs + M* meeting vein *Sc + R* at same point; mesopleurae normally without large punctures.

(3) **Allantini**.—Mandibles asymmetrical, left mandible with one or more inner teeth, right mandible unidentate; clypeus deeply emarginated for half or more its medial length and normally with narrow lateral lips; propleurae truncated on meson; veins *M* and *Rs + M* meeting vein *Sc + R* at same point; mesopleurae

with or without punctures, if with punctures, they are smaller and less coarse than those of the Eriocampini. Because of the modification of the mandibles, this is probably the most specialized tribe in this subfamily.

(4) **Acidiophorini**.—Erected by Benson (1938b) for the unusual South American genus *Acidiophora*, which has the stigma of the forewing narrow and elongated, much more than half the length of the radial cell, vein 2r straight and perpendicular to the stigma, and trifold tarsal claws. For a discussion and revision of this genus, see Smith (1972b).

As the larvae of Allantinae are all similar, they do not help substantiate the separation of tribes and are sometimes difficult to distinguish from the larvae of other subfamilies. The only distinct larvae are those of the genus *Dimorphopteryx*, which are unique in having long fleshy protuberances on the thorax and 10th abdominal tergum. All larvae of Allantinae are typically sawflylike, and the feeding stages can be recognized by the following combination of characters: Antennae conical, five-segmented; each mandible with inner mesal ridge and raised mesal area; thoracic legs normal, five-segmented, each with tarsal claw; prolegs present on abdominal segments 1 to 8 and 10; abdominal segments 1 to 9 each six-annulate, with annulets 2 and 4 and sometimes 1 with minute setae or tubercles or both.

The larvae are similar to those of the Blennocampinae, which lack elaborate spinelike ornamentation, but the mesal ridge of each mandible and presence of small setae or tubercles on annulet 1, if present, should separate the Allantinae. Yuasa (1922) gave a key to genera under the subfamily name Emphytinae, but the generic units have since been reorganized. Lorenz and Kraus (1957) treated the genera with the Blennocampinae in their work on the sawfly larvae of Europe.

Because the larvae bore into certain utilized products, such as apples, to form a pupal cell, the prepupa or nonfeeding stage is often found. Prepupae sometimes differ remarkably from the feeding stages, not only in coloration but in the shape of the mandibles. The mandibles of most prepupae have only three or four linear teeth. As yet, prepupae cannot be separated to genus because so few are available for study. The prepupae are separated in the first couplet of the following larval key to genera since most of the taxonomy is based on the feeding stages.

The larvae commonly secrete a white bloom, which covers the body and blends with the color of the foliage. The bloom of *Eriocampa* larvae is extensive and is in the form of long, white, flaky material sometimes exceeding the width of the larva itself.

In this respect, it may be a protective device, resembling the excreta of birds and thereby concealing the larvae from predation.

The life histories of Allantinae species are all similar. Larvae feed on the foliage of the host plant. On completion of feeding, they search for some suitable substance in which they bore to form a pupal cell. Few, if any, spin cocoons, and those that enter the soil make an earthen cell. There may be from one to three or four generations a year depending on the species and sometimes the latitude. They overwinter as prepupae in their cells and pupate and emerge as adults the following spring. Oviposition may be in the foliage or stems of the host. As with most sawflies, adults are very short-lived.

Terminology in this revision is the same as that in my previous publications (Smith, 1969a, 1969b, 1971). I have examined the types of all species discussed in this bulletin except most of those located in Europe.

The types not examined are those of *Tenthredo abdominalis* Fabricius (*Monostegia*), *T. basalis* Klug (*Allantus*), *T. candidata* Fallén (*Empria*), *T. cinctus* Linnaeus (*Allantus*), *T. equiseti* Fallén (*Ametastegia*), *T. glabrata* Fallén (*Ametastegia*), *T. luteola* Klug (synonym of *Monostegia abdominalis*), *T. ovata* Linnaeus (*Eriocampa*), *T. pallipes* Spinola (*Ametastegia*), *T. tener* Fallén (*Ametastegia*), and *T. viennensis* Schrank (*Allantus*).

Hosts

Hosts for the North American species of Allantinae are summarized in the following list. The host cited is the plant on which the larvae actually feed and does not include the many various substances in which they may form a pupal cell. This list includes only the host genera and only those recorded in North America. Additional hosts are known in Europe for some of the Holarctic or adventive species and these are given, if known, under those species.

Plant family and genus

Insect species

Salicaceae:

<i>Salix</i> -----	<i>Empria improba</i> (Cresson) (?)
	<i>Ametastegia rocia</i> , n. sp.
	<i>Ametastegia xenia</i> , n. sp. (?)

Juglandaceae:

<i>Juglans</i> -----	<i>Eriocampa juglandis</i> (Fitch)
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Plant family and genus

Insect species

Betulaceae:

Betula ----- *Dimorphopteryx abnormis* Rohwer (?)
Dimorphopteryx melanognathus Rohwer
Dimorphopteryx pinguis (Norton)
Empria candidata (Fallén)
Empria multicolor (Norton)
Allantus umbonatus Wong

Alnus ----- *Eriocampa ovata* (Linnaeus)
Dimorphopteryx melanognathus Rohwer
Dimorphopteryx pinguis (Norton)
Empria multicolor (Norton)
Monosoma inferentia (Norton)

Corylus ----- *Empria coryli* (Dyar)

Fagaceae:

<i>Castanea</i> -----	<i>Dimorphopteryx virginicus</i> Rohwer
<i>Quercus</i> -----	<i>Dimorphopteryx autumnalis</i> Rohwer

Polygonaceae:

Rumex ----- *Ametastegia articulata* (Klug)
Ametastegia equiseti (Fallén)
Ametastegia glabrata (Fallén)
Ametastegia tener (Fallén)

Polygonum ----- *Ametastegia articulata* (Klug)
Ametastegia glabrata (Fallén)
Ametastegia pulchella (Rohwer)

Rosaceae:

Fragaria ----- *Empria maculata* (Norton)
Empria obscurata (Cresson)
Allantus cinctus (Linnaeus)
Allantus mellipes (Norton)
Taxonus pallioxerus (Provancher)

Potentilla ----- *Empria maculata* (Norton)

Rosa ----- *Empria obscurata* (Cresson)
Aphilodyctium fidum (Cresson)
Allantus cinctus (Linnaeus)
Allantus basalis (Klug)
Allantus viennensis (Schrank)

Prunus ----- *Dimorphopteryx abnormis* Rohwer

Pyrus ----- *Dimorphopteryx abnormis* Rohwer

Amelanchier ----- *Dimorphopteryx abnormis* Rohwer
Dimorphopteryx pinguis (Norton) (?)

Crataegus ----- *Dimorphopteryx abnormis* Rohwer

Rubus ----- *Empria maculata* (Norton)
Taxonus pallidicornis (Norton)
Taxonus terminalis (Say)

Violaceae:

Viola ----- *Ametastegia pallipes* (Spinola)

Cornaceae:

Cornus ----- *Phrontosoma usta*, n. sp.
Macremphytus loveti MacGillivray
Macremphytus semicornis (Say)
Macremphytus tarsatus (Say)
Macremphytus testaceus (Norton)

Rubiaceae:

Cephalanthus ---- *Pseudosiobla cephalanthi* Rohwer
Pseudosiobla excavata (Norton)

Primulaceae:

Lysimachia ----- *Monostegia abdominalis* (Fabricius)

Systematic Arrangement

Family TENTHREDINIDAE

Subfamily ALLANTINAE³

Tribe ERIOCAMPINI

Genus *Eriocampa* Hartig

(1) *Eriocampa juglandis* (Fitch); New Brunswick and Ontario to North Carolina, west to Minnesota, Nebraska, Kansas; on *Juglans*.

(2) *Eriocampa ovata* (Linnaeus); Quebec and Ontario to Massachusetts and New York; British Columbia, Washington; Palaearctic; on *Alnus*.

Genus *Pseudosiobla* Ashmead

(3) *Pseudosiobla cephalanthi* Rohwer; Massachusetts, New York, Missouri; on *Cephalanthus*.

(4) *Pseudosiobla excavata* (Norton); Maine to Florida, west to Illinois, Missouri, Texas; on *Cephalanthus*.

Genus *Dimorphopteryx* Ashmead

(5) *Dimorphopteryx abnormis* Rohwer; New Brunswick to North Carolina, west to Saskatchewan, Montana, Illinois; on *Prunus*, *Pyrus*, *Amelanchier*, *Crataegus*, *Betula*.

(6) *Dimorphopteryx autumnalis* Rohwer; Virginia, Wisconsin; on *Quercus*.

³ Includes all New World genera.

(7) *Dimorphopteryx melanognathus* Rohwer; Newfoundland to Virginia, west to Ontario, Michigan; on *Betula*, *Alnus*.

(8) *Dimorphopteryx pinguis* (Norton); Nova Scotia to Tennessee, west to Saskatchewan, Iowa, Colorado; on *Betula*, *Alnus*.

(9) *Dimorphopteryx virginicus* Rohwer; Quebec to South Carolina and Georgia, west to Ontario, Ohio; on *Castanea*.

Tribe EMPRIINI

Genus *Empria* Lepeletier

(10) *Empria alpina* Benson; Northwest Territories, Yukon Territory, British Columbia; Palaearctic.

(11) *Empria candidata* (Fallén); New Brunswick and Maine, west to Alaska, British Columbia; Palaearctic; on *Betula*.

(12) *Empria coryli* (Dyar); New Hampshire and New York, west to Wisconsin, Iowa, Missouri; on *Corylus*.

(13) *Empria eosa*, new species; south-central Mexico.

(14) *Empria ignota* (Norton); Newfoundland to New Jersey, west to Pacific Coast States and Provinces.

(15) *Empria improba* (Cresson); Newfoundland, Quebec, Maine, west to Pacific Coast States and Provinces; on *Salix* (?).

(16) *Empria maculata* (Norton); Newfoundland to North Carolina, west to Pacific Coast States and Provinces; on *Fragaria*, *Potentilla*, *Rubus*.

(17) *Empria mexicana* (Cameron); New Mexico, Arizona, Durango.

(18) *Empria multicolor* (Norton); Nova Scotia to Georgia, west to British Columbia, Washington, Oregon, California; on *Betula*, *Alnus*.

(19) *Empria nordica* Ross; Northwest Territories, Manitoba.

(20) *Empria obscurata* (Cresson); Newfoundland to New Jersey, west to Pacific Coast States and Provinces; on *Fragaria*, *Rosa*.

Genus *Phrontosoma* MacGillivray

(21) *Phrontosoma belfragei* (Cresson); Quebec to New Jersey, west to Alberta, Kansas, Texas.

(22) *Phrontosoma brocca*, new species; Quebec, New York, Manitoba, Oregon.

(23) *Phrontosoma usta*, new species; Quebec to Connecticut and New York, west to Minnesota, Illinois; on *Cornus*.

Genus *Haymatus*, new genus

(24) *Haymatus blassus*, new species; South Carolina.

Genus *Ametastegia* A. Costa

- (25) *Ametastegia angusta* (Kincaid); Alaska to Arizona.
(26) *Ametastegia aperta* (Norton); Newfoundland to Alabama, west to Alberta, Colorado.
(27) *Ametastegia articulata* (Klug); New Brunswick to Florida, west to Minnesota, Texas, south into Mexico; on *Rumex*, *Polygonum*.
(28) *Ametastegia becræ*, new species; New York to North Carolina, west to Iowa, Louisiana.
(29) *Ametastegia championi* (Cameron); Guatemala.
(30) *Ametastegia coloradensis* (Weldon); Labrador to Yukon Territory, south to Colorado, California.
(31) *Ametastegia equiseti* (Fallén); Nova Scotia to North Carolina, west to Alaska, Washington, Oregon; Palaearctic; on *Rumex*.
(32) *Ametastegia glabrata* (Fallén); Nova Scotia to Maryland, west to British Columbia, Washington, Oregon; Palaearctic; on *Rumex*, *Polygonum*.
(33) *Ametastegia mexicana* (Cameron); Mexico.
(34) *Ametastegia pallipes* (Spinola); Newfoundland to Virginia, west to British Columbia, Washington, Oregon; Palaearctic; on *Viola*.
(35) *Ametastegia pulchella* (Rohwer); Maine to Alabama, west to Iowa, Kansas; on *Polygonum*.
(36) *Ametastegia recens* (Say); District of Columbia, Illinois, Montana, Utah, Washington, Oregon, California.
(37) *Ametastegia rocia*, new species; New Brunswick, Quebec, west to Northwest Territories, Wisconsin, Missouri; on *Salix*.
(38) *Ametastegia tener* (Fallén); New Brunswick to Virginia, west to Pacific Coast States and Provinces; Palaearctic; on *Rumex*.
(39) *Ametastegia xenia*, new species; Newfoundland to New York, west to Ontario, Illinois, Kansas, Oklahoma; on *Salix* (?).

Genus *Monosoma* MacGillivray

- (40) *Monosoma inferentia* (Norton); Newfoundland to North Carolina, west to British Columbia, Minnesota, Illinois; on *Alnus*.

Genus *Monostegia* O. Costa

- (41) *Monostegia abdominalis* (Fabricius); Quebec to New Jersey, west to Ontario, Ohio; Palaearctic; on *Lysimachia*.

Genus *Somanica*, new genus

- (42) *Somanica occua*, new species; Georgia.

Genus *Aphilodyctium* Ashmead

(43) *Aphilodyctium fidum* (Cresson); Quebec, Maine to North Carolina, west to British Columbia, Washington, Oregon, California; on *Rosa*.

Genus *Antholcus* Konow

(44) *Antholcus varinervius* (Spinola); Chile, Argentina.

Tribe ALLANTINI

Genus *Allantus* Panzer

(45) *Allantus albolabris* (Rohwer); Alberta, Alaska, south to Colorado, Oregon.

(46) *Allantus basalis* (Klug); Newfoundland to Tennessee; Palaearctic; on *Rosa*.

(47) *Allantus cinctus* (Linnaeus); Newfoundland to Virginia, west to Wisconsin, Illinois; British Columbia, Washington; Palaearctic; on *Rosa*, *Fragaria*.

(48) *Allantus mellipes* (Norton); Nova Scotia to Florida, west to Alberta, Colorado; on *Fragaria*.

(49) *Allantus nigriritibialis* Rohwer; New Jersey (?); East Asia.

(50) *Allantus rahmus*, new species; Northwest Territories, Alaska.

(51) *Allantus umbonatus* Wong; Quebec to British Columbia; on *Betula*.

(52) *Allantus viennensis* (Schränk); New York; Palaearctic; on *Rosa*, *Rubus*.

Genus *Macremphytus* MacGillivray

(53) *Macremphytus lovetti* MacGillivray; Alberta, Montana, west to British Columbia, Oregon; on *Cornus* (?).

(54) *Macremphytus semicornis* (Say); Newfoundland to New York, west to British Columbia, Minnesota, Illinois; on *Cornus*.

(55) *Macremphytus tarsatus* (Say); Newfoundland to Florida, west to Minnesota, Kansas, Texas; on *Cornus*.

(56) *Macremphytus testaceus* (Norton); New Brunswick to Georgia, west to Manitoba, Minnesota, Colorado; on *Cornus*.

Genus *Taxonus* Hartig

(57) *Taxonus borealis* MacGillivray; Newfoundland to North Carolina, west to Ontario, Wisconsin.

- (58) *Taxonus epicera* (Say); Quebec to North Carolina, west to Wisconsin, Iowa, Kansas, Texas.
- (59) *Taxonus pallicoxus* (Provancher); Nova Scotia to Georgia, west to British Columbia, Minnesota, Illinois; on *Fragaria*.
- (60) *Taxonus pallidicornis* (Norton); Quebec, Maine to Florida, west to Wisconsin, Missouri, Louisiana; on *Rubus*.
- (61) *Taxonus pallipes* (Say); Quebec to Georgia, Alabama, west to Michigan, Illinois.
- (62) *Taxonus proximus* (Provancher); Quebec, Maine, Ontario, South to Georgia.
- (63) *Taxonus rufocinctus* (Norton); Quebec, Maine to Georgia, west to Minnesota, Missouri, Arkansas.
- (64) *Taxonus spiculatus* (MacGillivray); Maine to North Carolina, Tennessee, west to Ohio.
- (65) *Taxonus terminalis* (Say); Nova Scotia to Florida, west to Saskatchewan, Minnesota, Texas; on *Rubus*.

Genus *Probleta* Konow

- (66) *Probleta albiventris* Malaise; Brazil.
- (67) *Probleta bicolor* (Kirby); Brazil.
- (68) *Probleta bicolorata* Malaise; Brazil.
- (69) *Probleta bilanx* (Konow); Brazil.
- (70) *Probleta collariata* Konow; Brazil.
- (71) *Probleta columbiana* (Enderlein); Colombia.
- (72) *Probleta disiunctiva* (Konow); Peru.
- (73) *Probleta frenata* Konow; Peru, Surinam.
- (74) *Probleta gracilicornis* Konow; Brazil.
- (75) *Probleta langei* Konow; Brazil.
- (76) *Probleta nigropunctata* Malaise; Brazil.
- (77) *Probleta sahlbergi* Malaise; Brazil.
- (78) *Probleta usta* Forsius; Brazil.
- (79) *Probleta wygodzinskyi* Malaise; Brazil.

Genus *Protoprobleta* Malaise

- (80) *Protoprobleta fulvonigra* Malaise; Brazil.
- (81) *Protoprobleta nigra* Malaise; Brazil.

Tribe ACIDIOPHORINI

Genus *Acidiophora* Konow

- (82) *Acidiophora bokama* Smith; Brazil.
- (83) *Acidiophora decora* Konow; Brazil, Argentina.

- (84) *Acidiophora gecera* Smith; Brazil, Argentina.
 (85) *Acidiophora konowi* Smith; Peru.
 (86) *Acidiophora larira* Smith; Brazil.
 (87) *Acidiophora longipennis* (Cameron); Brazil.
 (88) *Acidiophora manni* Smith; Bolivia.

Keys to Allantinae Genera

ADULTS

1. Tarsal claws trifold (pl. XXIV, 292); forewing with stigma elongate, more than half length of radial cell; red and black shining insects with fasciate wings [South America] ----- *Acidiophora* Konow
 Tarsal claws various, but never trifold; stigma of forewing less than half length of radial cell; color various, but wings always uniformly hyaline or infuscated ----- 2
2. Mesepisternum, mesoscutellum, and sometimes other parts of mesonotum and head with coarse, closely set, deep punctures; in forewing, vein *M* meeting *Sc* + *R* slightly basad to point where *Rs* + *M* meets *Sc* + *R* (pl. I, 32); robust species ----- 3
 Mesepisternum and mesoscutellum without coarse, deep punctures, if some present, separated by broad shiny areas; in forewing, veins *M* and *Rs* + *M* meeting *Sc* + *R* at same point (pl. XI, 146); mostly elongate insects ----- 5
3. Genal carina absent, or at most scarcely developed below eye; clypeus subtruncated ----- *Pseudosiobla* Ashmead
 Genal carina distinct, extending to top of head; clypeus distinctly emarginated ----- 4
4. Frons with circular carina enclosing front ocellus; second antennal segment longer than broad; male without peripheral vein in hindwing ----- *Eriocampa* Hartig
 Frons without carina; second antennal segment as broad or broader than long; hindwing of male with peripheral vein ----- *Dimorphopteryx* Ashmead
5. Basal abdominal terga each with a pair of white spots, one on each side of meson (pl. V, 81) [not obvious in *eosa*, n. sp., from Mexico, but separated from other genera in that area by presence of cell *M* in hindwing] ----- *Empria* Lepeletier
 Abdomen without such white spots, either unicolorous or combination of red or orange and black ----- 6
6. Mandibles asymmetrical, left mandible with more subapical teeth than right mandible (pl. XXII, 263-265); clypeus deeply, circularly incised, usually for half its medial length, with narrow lateral lips (pl. XXII, 259-261); tarsal claw with long inner tooth and distinct basal lobe (pl. XVII, 214) ----- 7
 Mandibles symmetrical, each bidentate (pl. X, 141); clypeus shallowly emarginated or subtruncated (pl. XI, 150-151); tarsal claw various, but if with basal lobe it is low and rounded [except *Antholcus*] ----- 11

7. Genal carina absent 8
 Genal carina distinct, extending to top of head 9
8. Clypeus deeply incised, almost to base; labrum truncated, much broader than long (pl. XXIV, 293) [South America] *Probleta* Konow
 Clypeus incised for about half its medial length; labrum rounded, as long as broad (pl. XXIV, 294) [South America] *Protoprobleta* Malaise
9. Hindbasitarsus shorter than following hindtarsal segments combined; cell *M* absent in hindwing *Allantus* Panzer
 Hindbasitarsus longer than following hindtarsal segments combined; cell *M* present in hindwing 10
10. First free sector of vein *Rs* present in forewing, therefore with four cubital cells (pl. XXI, 255); cell *Rs* usually present in hindwing and anal cell sessile; hindwing of male with peripheral vein *Taxonus* Hartig
 First free sector of vein *Rs* absent in forewing, therefore with three cubital cells; cell *Rs* absent in hindwing and anal cell petiolate; hindwing of male without peripheral vein *Macremphytus* MacGillivray
11. Hindwing without cell *M*; anal crossvein of forewing oblique or nearly perpendicular 12
 Hindwing with cell *M*; anal crossvein of forewing oblique 14
12. Genal carina absent *Somanica*, n. genus
 Genal carina distinct to top of eyes 13
13. Clypeus subtruncated or with V-shaped emargination, sometimes with median keel (pl. XI, 150, 151); anal crossvein of forewing nearly perpendicular (pl. XI, 146); first free sector of vein *Rs* of forewing present or absent *Ametastegia* A. Costa
 Clypeus circularly emarginated, smooth, without median keel (pl. XVII, 211); anal crossvein of forewing oblique; first free sector of vein *Rs* of forewing present *Aphilodyctium* Ashmead.
14. Malar space narrow, less than diameter of front ocellus; propleurae acute or narrowly rounded and narrowly meeting on meson 15
 Malar space broad, $1\frac{1}{2}$ times or more diameter of front ocellus; propleurae truncated and broadly meeting on meson 17
15. Tarsal claw with distinct basal lobe; abdomen red [no genal carina; clypeus circularly emarginated; Chile and southern Argentina] *Antholcus* Konow
 Tarsal claw without basal lobe or with only an indistinct rounded lobe; abdomen black 16
16. Clypeus shallowly emarginated (pl. IX, 128); short genal carina present; third antennal segment longer than fourth segment (pl. IX, 126) *Phrontosoma* MacGillivray
 Clypeus truncated (pl. X, 141); no genal carina; third and fourth antennal segments subequal in length (pl. X, 143) *Haymatius*, n. genus
17. Genal carina present; hindtarsus slender, slightly longer than length of hindtibia (pl. XV, 188) *Monosoma* MacGillivray
 Genal carina absent; hindtarsus short, about two-thirds length of hindtibia (pl. XV, 192) *Monostegia* O. Costa

LARVAE

1. Left mandible with three or four teeth, right mandible with three teeth, teeth arranged in linear row ----- prepupae
Each mandible with more than four teeth, with distinct dorsal and ventral cutting edges and mesal ridge; feeding stages ----- 2
2. Long fleshy protuberances on pronotum, mesonotum, 9th tergum, and apex of 10th abdominal tergum (pl. V, 74, 75) -----
----- *Dimorphopteryx* Ashmead
Body without such protuberances ----- 3
3. Annulets 1, 2, and 4 of each abdominal segment 1 to 9 with setae and/or tubercles (pl. IX, 120; pl. XIX, 237) ----- 4
Only annulets 2 and 4 with setae and/or tubercles; no ornamentation on annulet 1 (pl. II, 48) ----- 5
4. First annulet of each abdominal segment 1 to 9 with small setae only (pl. IX, 120); left mandible with two ventral teeth, inner tooth broad and concave (pl. IX, 125) ----- *Empria* Lepeletier
First annulet of each abdominal segment 1 to 9 with setae and tubercles (pl. XIX, 237); left mandible with three ventral teeth, inner two teeth truncate (pl. XIX, 234) ----- *Allantus* Panzer
5. Left mandible without ventral teeth, ventral margin with ridge only, ending in small tooth at apex (pl. XX, 252) -----
----- *Macremphytus* MacGillivray
Left mandible with two or three ventral teeth (pl. II, 45) ----- 6
6. Each mandible with two setae on outer surface (pl. II, 45) -----
----- *Eriocampa* Hartig
Each mandible with one seta on outer surface ----- 7
7. Left mandible with two ventral teeth, inner tooth truncate (pl. XXIV, 288); thoracic legs slender, trochanter longer than femur -----
----- *Taxonus* Hartig
Left mandible with three sharp ventral teeth (pl. III, 61); thoracic legs stouter, trochanter shorter than femur ----- 8
8. Right mandible with three sharp ventral teeth, subequal in size (pl. III, 60); body with surpedal dark-brown broken stripe and two dark-brown spots per segment above each spiracle; on *Cephalanthus* -----
----- *Pseudosiobla* Ashmead
Right mandible with ventral teeth various in size; body pattern not as above, either unicolorous or with dorsal or subdorsal continuous stripes; not on *Cephalanthus* ----- 9
9. Labrum with deep central emargination (pl. XIV, 183); large bifid inner tooth on ventral margin of right mandible (pl. XIV, 181); lower mesal margin of right mandible without area of many small teeth; various hosts ----- *Ametastegia* A. Costa
Labrum with broad shallow emargination (pl. XVI, 201); ventral margin of right mandible with three sharp teeth (pl. XVI, 198); mesal area with many small teeth clustered on lower part; on *Lysimachia* ----- *Monostegia* O. Costa

Tribe ERIOCAMPINI

Genus ERIOCAMPA Hartig

Eriocampa Hartig, 1837, p. 279; Dalla Torre, 1894, p. 130; Konow, 1905, p. 100; Rohwer, 1911b, p. 79; Enslin, 1914, p. 207; MacGillivray, 1916, p. 58; Yuasa, 1922, p. 51; Ross, 1937b, p. 94; Kontuniemi, 1945, p. 190; Ross, 1951, p. 61; Benson, 1952, p. 95; Takeuchi, 1952, p. 30; Zirngiebl, 1956, p. 325; Lorenz and Kraus, 1957, p. 109; Benson, 1959, p. 124.

Type-species: *Tenthredo ovata* Linnaeus. Designated by Rohwer, 1911b.

Eriocampa subgenus *Brachyocampa* Zirngiebl, 1956, p. 326.

Type-species: *Eriocampa dorpatica* Konow. Original designation.

Adult.—Antenna stout, second segment longer than broad, third segment longer than fourth segment, apical four segments reduced in length. Clypeus moderately emarginated; sharp circular carina on frons enclosing front ocellus; malar space less than half diameter of front ocellus; genal carina distinct, extending to top of eyes; left mandible with small tooth near base, right mandible unidentate (pl. I, 36, 37). Propleurae slightly truncated on meson; mesopleuron and mesoscutellum with large, closely set, deep punctures; lobes of mesoprescutum protuberant. Tarsal claw with long inner tooth and acute basal lobe (pl. I, 34). Forewing with anal crossvein oblique; vein *M* meeting *Sc* + *R* slightly basad to point where vein *Rs* + *M* meets *Sc* + *R* (pl. I, 32). Hindwing with cells *Rs* and *M* both present; anal cell petiolate, petiole less than width of cell (pl. I, 33). Hindwing of male without peripheral vein.

Larva.—Distinguished by having only setae on annulets 2 and 4 of each abdominal segment 1 to 9 and by having two setae on the outer surface of each mandible. The latter is unique for this genus in the Allantinae. When feeding, the larvae secrete a long, white, flaky substance, which may obtain a length of more than the width of their body. The larva thus appears like bird excreta on a leaf.

Discussion.—Two of the ten species of this Holarctic genus are found in North America. A number of fossils have been assigned to this genus, some probably incorrectly. All species are large, robust insects and are readily recognized by the sharp circular carina on the frons, coarse punctures of the mesopleuron and mesoscutellum, and protuberant lobes of the mesoprescutum. The subgenus *Brachyocampa* was proposed to include those species

with a shining abdomen, lacking fine transverse sculpture, and included *dorpatica* Konow from Europe and *peineae* Zirngiebl from Iran. The Nearctic *juglandis* would fall into this subgenus. However, the variation in microsculpture of the abdomen of *ovata* makes this subgeneric grouping impractical.

The North American species are associated with *Juglans* and *Alnus*.

Keys to *Eriocampa* Species

Adults

- Thorax black; legs mostly white; postocellar area smooth, with few punctures (♀ and ♂) ----- *E. juglandis* (Fitch)
 Thorax black with posterior half of pronotum and mesonotum except for scutellum red; legs mostly black; numerous large, coarse punctures on postocellar area (♀ only; ♂ not known in North America) ----- *E. ovata* (Linnaeus)

Larvae

- Head unicolorous, amber; on *Juglans* ----- *E. juglandis* (Fitch)
 Head with dark-brown patch on vertex; on *Alnus* ----- *E. ovata* (Linnaeus)

Descriptions of *Eriocampa* Species

Eriocampa juglandis (Fitch)

- Tenthredo* (*Allantus*) *obesus* Harris, 1835, p. 583. Nomen nudum.
Selandria ? *juglandis* Fitch, 1857, p. 467; Thomas, 1881, p. 67; Dalla Torre, 1894, p. 143.
Eriocampa juglandis: Dyar, 1897b, p. 200; Ross, 1951, p. 61.
Allantus obesus Norton, 1860, p. 260; Norton, 1867, p. 264; Ross, 1951, p. 82; Smith, 1966, p. 248 (= *juglandis* Fitch).
Sciapteryx obesus: Cresson, 1880b, p. 59; Dalla Torre, 1894, p. 22.
Eriocampa obesa: Konow, 1905, p. 82.
Sciapteryx rotundus Norton, 1867, p. 242; Dalla Torre, 1894, p. 22; Ross, 1951, p. 61 (= *juglandis* Fitch).
Eriocampa rotunda: Konow, 1905, p. 101; MacGillivray, 1916, p. 58.
Selandria caryae: Norton, 1869, p. 224; Packard, 1890, p. 338. Both references pertain to larvae; adults are *Erythraspides vitis* (Harris) (Smith, 1969a, p. 160).
Eriocampa rotundiformis Rohwer, 1909, p. 16; Ross, 1951, p. 61 (= *juglandis* Fitch).

Female.—Length, 7.7 to 8.4 mm. Black with following white: Legs except basal half of each coxa, apical third of hindfemur, and apical third of hindtibia. Venter of apical four antennal segments and maxillary and labial palpi brownish. Wings hyaline; veins and stigma black.

Head shining with few punctures, postocellar area with few, fine punctures; front and lateral lobes of mesonotum smooth and shining; abdomen without transverse sculpturing. Sheath straight above, rounded below and at apex (pl. I, 38). Lancet with 17 serrulae, each serrula moderately deep, rounded, with 1 anterior and no posterior subbasal teeth (pl. I, 42).

Male.—Length, 6.3 to 6.8 mm. Coloration and structure similar to those of female. Parapenis high (pl. I, 40); penis valve oblong, with row of about nine stout spines on margin (pl. I, 41).

Larva.—Late feeding stage, 15 to 21 mm long. Head amber with eyespot and apex of each mandible black. Body unicolorous amber, probably green when alive; when feeding commonly with long, dense, flaky white bloom, which is secreted after each molt.

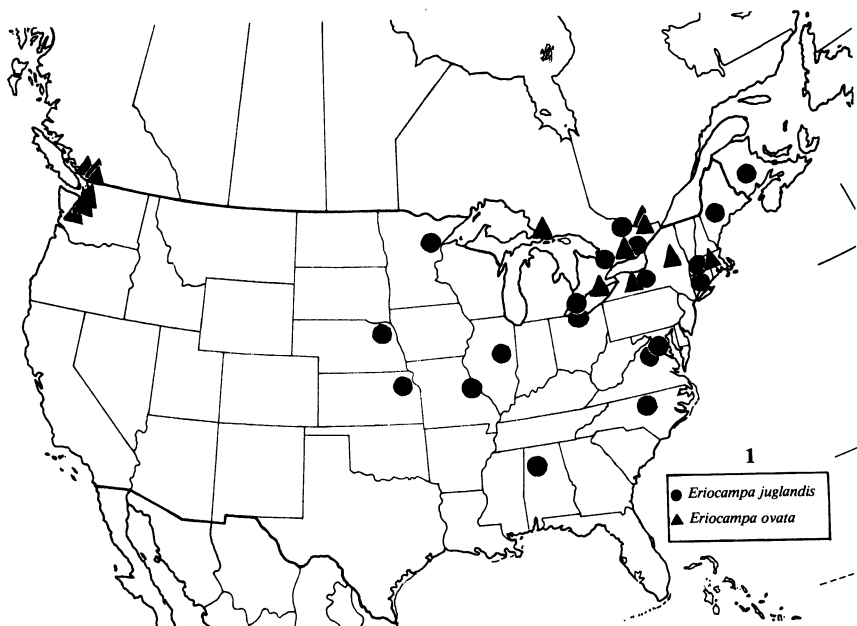
Head with abundant short hairs. Clypeus with six setae. Labrum deeply emarginated for more than half its medial length, with 3 long setae on each half and 8 to 12 short setae mesially; epipharynx with 10 to 12 stout spines on each half, arranged in longitudinal row except for those at apex (pl. II, 47). Maxillary palpus 4-segmented, second segment with 1 seta, palpifer with 4 setae, stipes with 1 seta; apex of stipes produced into triangularly shaped extension; lacinia with 15 to 17 spines (pl. II, 46). Left mandible with three ventral teeth, inner tooth truncate, three dorsal teeth, inner tooth broad and truncate, and mesial ridge with elevated region connecting outer dorsal tooth and ventral teeth; right mandible with two ventral teeth, two dorsal teeth, inner tooth broad and truncate, and one or two teeth on mesial ridge; each mandible with two setae on outer surface (pl. II, 44, 45). Labial palpus three-segmented, second segment with one seta; submentum with six setae.

Thoracic legs stout; trochanter not longer than either tibia or tarsus. Abdominal segments 1 to 9 each six-annulate; second and fourth annulets, spiracular and surpedal lobes each with several setae; tubercles absent. Numerous hairs on suranal and subanal areas.

Holotypes.—Fitch (1857) described this species from larvae; I could not find specimens that may be considered types. *A. obesus* Norton: At the Museum of Comparative Zoology, Harvard University, type No. 26310, labeled "174" and "Eriocampa obesa Norton"; the end of the abdomen is missing. *S. rotundus* Norton: Not located. *E. rotundiformis* Rohwer: At the University of Nebraska, ♂, labeled "West Point, Neb., June."

Distribution.—Eastern North America (fig. 1):⁴ New Bruns-

⁴ Throughout this bulletin, States and Provinces are listed from north to south and east to west, not alphabetically.



wick, Maine, Massachusetts, Connecticut, Maryland, Virginia, North Carolina, Ontario, New York, Ohio, Alabama, Illinois, Minnesota, Missouri, Nebraska, Kansas.

Host.—*Juglans nigra* L., *Juglans* sp.

Biology.—From information associated with Hopkins' No. 13627, larvae were collected from black walnut foliage on July 16, 1915, in Connecticut. On August 26, 1915, one adult emerged. Adults have been collected from May through August. There may be two generations a year as for *ovata*. Dyar (1897b) reared this species, but he gave little information.

Discussion.—Adults and larvae of the two species of *Eriocampa* are easily separated by the color characters given in the preceding key to species. Some authors have confused the larvae of *juglandis* with the adults of "*Selandria caryae* Norton," a synonym of *Erythraspides vitis* (Harris), a species in the Blennocampinae that feeds on grape (Smith, 1969a). I have no idea how this mixup occurred.

Eriocampa ovata (Linnaeus)

Tenthredo ovata Linnaeus, 1761, p. 392; Malaise and Benson, 1934, p. 7.

Eriocampa ovata: Dalla Torre, 1894, p. 131, gives references to this species in European literature prior to 1894; Konow, 1905, p. 100; Rohwer, 1911b, p. 79; Enslein, 1912, p. 304; Enslein, 1914, p. 208; Conde, 1927, p.

77; Obarski, 1934, p. 154; Beffa, 1934, p. 585; Hsin, 1935, p. 294; Kontuniemi, 1945, p. 191; Berland, 1947, p. 211; Ross, 1951, p. 61; Benson, 1952, p. 95; Maxwell, 1955, p. 83; Lorenz and Kraus, 1957, p. 109; Bouchard, 1961, p. 70; Benson, 1968, p. 154.

Female.—Length, 6.8 to 7.2 mm. Antenna black with venter of apical four or five segments whitish. Head black. Thorax black with posterior half of pronotum and front and lateral lobes of mesonotum red. Legs black with inner surface of foretibia and basal quarter of hindfemur white. Abdomen black. Wings hyaline; veins and stigma black.

Head with numerous deep, coarse punctures; mesonotum shining with few scattered punctures on prescutum and lateral lobes and more numerous punctures on scutellum; abdomen with fine transverse microsculpture. Sheath straight above, rounded below and at apex. Lancet with about 20 serrulae, each serrula moderately deep, rounded, with 1 anterior and no posterior subbasal teeth (pl. I, 43).

Male.—Unknown in North America. Rare in Europe (Benson, 1952). A parthenogenetic species.

Larva.—Similar to that of *juglandis* except for the presence of a dark-brown spot on vertex of head. Described by Lorenz and Kraus (1957); internal anatomy described by Maxwell (1955); and whitish bloom, which is secreted by certain epidermal glands, studied by Hsin (1935).

Holotype.—In the collection of the Linnean Society of London, England (Malaise and Benson, 1934).

Distribution.—Europe; eastern and western North America (fig. 1): Quebec, Massachusetts, Ontario, New York, British Columbia, Washington. Apparently an adventive species accidentally introduced from Europe independently into both eastern and western ports.

Hosts.—*Alnus rubra* Bong., from reared specimens; *A. rugosa americana* (Regel) Fern. (Bouchard, 1961); *A. glutinosa* (L.) Gaertn. (Benson, 1952); also recorded from *Ulmus* and *Corylus* in Europe by Conde (1927) and *A. glutinosa* and *A. incana* (L.) Moench by Berland (1947).

Biology.—Bouchard (1961) studied this species in Quebec. There are two generations a year, adults of the first generation appearing in May and June and those of the second generation in July and August. The species is entirely parthenogenetic in North America. Eggs are inserted in the midrib of the leaf. Larvae begin feeding on the upper surface of the leaf but later go to the lower surface. On maturing, the larvae drop to the ground where they

spin cocoons in the litter for overwintering and pupation. According to Benson (1952), there is a single brood in England.

Discussion.—A subspecies *nitens* was described by Benson (1968) from Turkey. It is separated by the lack of fine, transverse microsculpture on the abdomen. All specimens I have seen from North America have this sculpturing.

This species was probably introduced independently into both eastern and western North America. The earliest records I have seen were 1908 from Toronto, Ontario, 1936 from Massachusetts, and 1932 from Vancouver, British Columbia.

Species described from Europe and considered synonymous with *ovata* are *Tenthredo gossypina* Retzius, *T. vernalis* Geoffroy, and *T. leucogona* Schrank (Enslin, 1914; Berland, 1947).

Genus PSEUDOSIOBLA Ashmead

Pseudosiobla Ashmead, 1898, p. 308; Rohwer, 1911a, p. 403; MacGillivray, 1916, p. 58; Ross, 1937b, p. 94; Ross, 1951, p. 62.

Type-species: *Allantus excavatus* Norton. Original designation.

Adult.—Antenna stout, second segment as long as broad, third segment nearly twice length of fourth segment, fourth to apical segments subequal in length (pl. II, 52). Clypeus subtruncate, very slightly emarginated; malar space less than diameter of front ocellus; genal carina scarcely developed below eye; each mandible bidentate (pl. II, 49, 50). Head and thorax covered with numerous, closely set punctures. Propleurae narrowly truncated on meson. Tarsal claw with long inner tooth and inconspicuous basal lobe (pl. II, 51). Forewing with anal crossvein oblique; vein *M* meeting *Sc* + *R* slightly basad to point where *Rs* + *M* meets *Sc* + *R*. Hindwing with cell *Rs* absent, cell *M* present; anal cell with short petiole, less than half width of cell. Hindwing of male with or without peripheral vein.

Larva.—The host, *Cephalanthus*, and the following characters will distinguish the larva: Body greenish with dark-brown, broken, surpedal stripe and two dark-brown spots per segment above each spiracle. Right mandible with three sharp ventral teeth and two large and two or three small teeth on mesal ridge; each mandible with one seta on outer surface (pl. III, 60, 61). Legs stout, trochanter shorter than tibia. Annulets 2 and 4 of each abdominal segment 1 to 9 with small tubercles and setae.

Discussion.—The species of this genus are large, robust insects with numerous deep punctures covering the head and thorax. The subtruncate clypeus, short genal carina, and absence of cell *Rs* in the hindwing will separate it from other North American genera.

It is allied to the Palaearctic *Siobla* Cameron, but *Pseudosiobla* has a narrower malar space and a small, rounded basal lobe on the tarsal claw.

The genus was revised by Rohwer (1911a), who included three species as did Ross (1951). I have included two valid species, both of which are associated with *Cephalanthus*. Because I have seen only a single larva of *cephalanthi* Rohwer, a key to larvae is not given.

Key to *Pseudosiobla* Species

Adults

- Clypeus smooth, white to yellow; serrulae of female lancet pointed at apices (pl. II, 55); hindwing of male without peripheral vein ----- *P. cephalanthi* Rohwer
- Clypeus rough, punctured, entirely or partially black or reddish brown; serrulae of female lancet flat (pl. II, 54); hindwing of male usually with peripheral vein ----- *P. excavata* (Norton)

Descriptions of *Pseudosiobla* Species

Pseudosiobla cephalanthi Rohwer

"5C," Dyar, 1895b, p. 339.

Siobla excavata: Dyar, 1897b, p. 190.

Pseudosiobla excavata: Howard, 1901, pl. 13, fig. 7.

Pseudosiobla cephalanthi Rohwer, 1911a, p. 404; Ross, 1951, p. 62.

Female.—Length, 8.7 to 9.7 mm. First two antennal segments yellow, remaining segments black. Head black; clypeus, labrum, and maxillary and labial palpi whitish to yellow. Thorax black with posterior margin of pronotum white and tegulae white to brownish. Legs whitish to yellow with each coxa, midfemur, and hindfemur black; forefemur and apex of hindtibia sometimes black. Abdomen black with basal plates white to yellow, second tergum and sometimes third to sixth terga reddish brown; each segment with narrow white band on posterior margin. Wings lightly, uniformly yellowish infuscated; costa and base of stigma of forewing reddish brown, apex of stigma and remaining veins mostly black.

Clypeus smooth, shining, without punctures. Sheath broadly rounded at apex, straight above and slightly rounded below (as in pl. II, 53). Lancet with about 30 serrulae, each serrula low, pointed at apex, with no anterior and 7 to 10 fine, posterior sub-basal teeth (pl. II, 55).

Male.—Length, 8.7 to 9.3 mm. Coloration and structure similar to those of female. Hindwing without peripheral vein. Parapenis of genitalia long and rounded at apex; penis valve broad at center, narrowing to small apical lobe, with long lateral spine (pl. III, 58).

Larva.—From the single specimen examined, the larva is similar to that of *excavata* except for the following color differences: Frons and head below eyes mostly brown; surpedal longitudinal stripe more continuous and less broken.

Holotype.—At the U.S. National Museum, ♀, labeled "Collection H. G. Dyar," "5C," and "Insect Book, pl. 13, fig. 7."; type No. 13966. Dyar's "5C" is from near New York City. The adult was bred from larvae on buttonbush.

Distribution.—Known only from the following localities (fig. 2):⁵

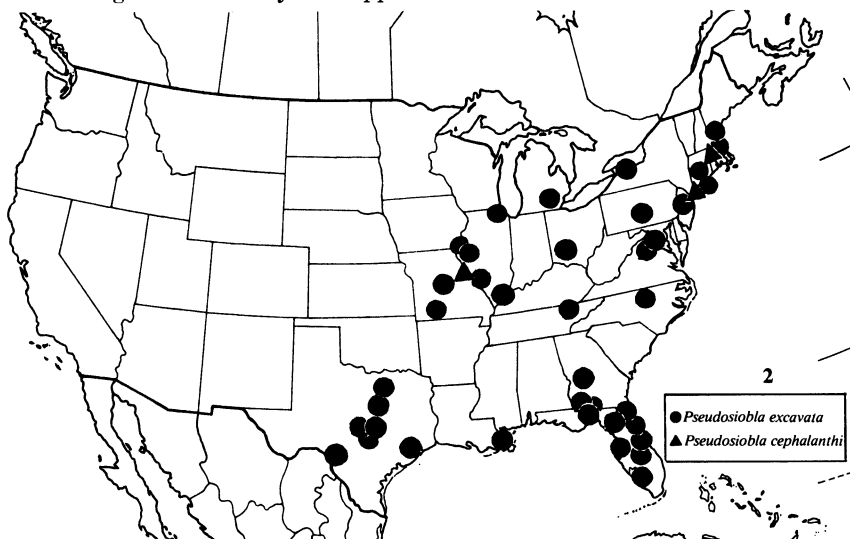
MASSACHUSETTS: Lynfield, V-23-24, V-24-24, 1924 (five specimens, the host label on one is *Vaccinium*, on the others, *Cephalanthus*); Melrose, V-29-24, *Cephalanthus*; Framingham, V-16-15. NEW YORK: Near New York City (Dyar's "5C."). MISSOURI: St. Peters, V-1940.

Host.—*Cephalanthus occidentalis* L.

Biology.—Dyar (1897b) reared this species. Larvae were collected in early June and disappeared into the ground by the middle of June. Adults emerged the following spring.

Discussion.—This is not a common species. It is separated from *excavata* by the smooth yellow clypeus and deeper and more

⁵ Throughout this bulletin, information pertaining to specific distribution records is given essentially as it appears on the insect labels.



pointed serrulae of the female lancet. The references by Dyar and Howard to "5C" and *excavata* given in the synonymy refer to *cephalanthi*.

Pseudosiobla excavata (Norton)

Allantus excavatus Norton, 1862b, p. 143.

Macrophya excavata: Norton, 1867, p. 266; Norton, 1872, p. 86.

Siobla excavata: Kirby, 1882, p. 253; Dalla Torre, 1894, p. 63.

Pseudosiobla excavata: Ashmead, 1898, p. 308; Rohwer, 1911a, p. 404; MacGillivray, 1916, p. 58; Ross, 1951, p. 62; Maxwell, 1955, p. 84.

Encarsioneura excavata: Konow, 1905, p. 119.

Siobla robusta Kirby, 1882, p. 253; Dalla Torre, 1894, p. 64; Ross, 1951, p. 62 (= *excavata* Norton).

Encarsioneura robusta: Konow, 1905, p. 119.

Pseudosiobla robusta: Rohwer, 1911a, p. 403; MacGillivray, 1916, p. 58.

Taxonus floridanus Provancher, 1889, p. 352; Dalla Torre, 1894, p. 111; Konow, 1905, p. 109; Smith, 1975b, p. 298 (= *excavata* Norton).

Pseudosiobla floridana: MacGillivray, 1908, p. 366 (= *robusta* Kirby); Rohwer, 1911a, p. 403; Rohwer, 1912b, p. 209; Middleton, 1922b, p. 11; Ross, 1951, p. 62.

Female.—Length, 9.0 to 9.8 mm. First two antennal segments and basal half or all of third segment reddish brown, remaining segments black. Head black, sometimes vertex and frons reddish brown; clypeus black, sometimes anterior margin reddish brown; labrum and maxillary and labial palpi yellowish. Thorax black with posterior margin of pronotum yellowish; pronotum, meso-scutellum, and margins of other lobes of mesonotum sometimes reddish brown; metanotum black or reddish brown. Legs yellow to orange with each coxa, midfemur, hindfemur, and apex of hind-tibia black; midfemur sometimes orange. Abdomen black with basal plates yellow or reddish brown, second to sixth terga sometimes reddish brown; each segment with narrow white band on posterior margin. Wings moderately to lightly, uniformly, infuscated; costa and base of stigma of forewing reddish brown, apex of stigma and remaining veins mostly black.

Clypeus with distinct punctures, not smooth. Sheath straight above, rounded below (pl. II, 53). Lancet with about 27 serrulae, each serrula low, flat, with 1 prominent anterior and 8 to 10 fine posterior subbasal teeth; serrulae toward apex of lancet nearly indistinguishable from each other (pl. II, 54).

Male.—Length, 8.7 to 9.3 mm. Coloration variable as that for female but more commonly with third antennal segment black and abdominal terga beyond third black. Hindwing with peripheral vein, sometimes absent between radial cell and vein *M*. Parapenis of genitalia long, rounded at apex; penis valve broad, narrowing toward apex and with long lateral spine (pl. III, 56, 57).

Larva.—Late feeding stage, 14 to 24 mm long (pl. III, 62). Head mostly brown with lower half of frons and area below eyes and around mouthparts white. Body pale, probably green when alive, with supraspiracular line of dark-brown spots with two spots per segment and surpedal dark-brown stripe with three to four spots per segment; surpedal line more continuous than supraspiracular line.

Clypeus with six setae. Labrum slightly emarginated, with 6 setae; epipharynx with 18 to 22 spines in arcuate row on each half (pl. III, 59). Left mandible with 3 ventral teeth, inner tooth bifid, 3 dorsal teeth, inner tooth broad and truncate, and mesial ridge connecting outer dorsal tooth with inner ventral tooth; right mandible with 3 large ventral teeth, 3 large dorsal teeth, inner dorsal tooth broad and truncate, and lower mesial area with 7 to 10 minute teeth; each tooth of each mandible with many fine subteeth on margin; each mandible with 1 seta on outer surface (pl. III, 60, 61). Maxillary palpus 4-segmented, second segment with 1 seta, palpifer with 4 setae, stipes with 1 seta, lacinia with row of about 14 spines (similar to pl. II, 46). Labial palpus three-segmented, second segment with one seta, submentum with six setae.

Thoracic legs stout, trochanter shorter than either femur or tibia. Abdominal segments 1 to 9 each six-annulate; annulets 2 and 4 with small setae and tubercles; spiracular and surpedal lobes each with several setae and tubercles; 10th tergum with few setae and tubercles; suranal and subanal areas with numerous hairs.

The larva was described by Middleton (1922*b*) and the internal anatomy by Maxwell (1955).

Holotypes.—*A. excavatus* Norton: At the Academy of Natural Sciences of Philadelphia, type No. 244, ♀, labeled "Maryland." *S. robusta* Kirby: At the British Museum, Natural History, London, type No. 1.359, ♀, labeled "631 Georgia." *T. floridanus* Provancher: At the U.S. National Museum, type No. 13965, ♂, labeled "Jacksonville, Fla.," "type," "Collection W. H. Ashmead," and the name label "*Sciapteryx floridanus* Prov., type" (Smith, 1975*b*).

Distribution.—Eastern North America (fig. 2): Maine, Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, Maryland, Virginia, North Carolina, Georgia, Florida, Michigan, Ohio, Tennessee, Illinois, Missouri, Louisiana, Texas.

Hosts.—*Cephalanthus* sp., *C. occidentalis* L.

Biology.—This species was reared from these hosts in Virginia and recorded under Hopkins' Nos. 10145 and 10783^m. For both

rearings, larvae were collected in mid-June as solitary feeders on the edge or undersurface of the leaf. They were slate gray with a white bloom. By mid-July, all larvae had entered the ground where they made dirt cells by cementing particles of sand together. Adult emergence took place the following year during late May and early June and the female oviposited on the upper surface of the leaf. Most adult collection records are for May and June, though during April in Texas and March and April in Florida. There is apparently a single generation a year.

Discussion.—This species shows some color variation, especially on the periphery of its range in Georgia, Florida, and Texas, where collected specimens have more reddish brown on the head, thorax, and abdomen and have more darkly infuscated wings. Kirby and Provancher described these color variants as separate species, but they are structurally similar to the typical *excavata* and are here treated as synonyms.

The roughened and usually black clypeus, flatter serrulae of the lancet, and presence of a distinct anterior subbasal tooth on each serrula of the lancet will separate this species from *cephalanthi*. Also, the male normally has a peripheral vein in the hindwing.

The similarity of *Pseudosiobla* and *Siobla* (= *Encarsioneura* Konow) resulted in the placement of *excavata* or its synonyms in *Encarsioneura* by some authors.

Genus DIMORPHOPTERYX Ashmead

Dimorphopteryx Ashmead, 1898, p. 308; Rohwer, 1911a, p. 405; Rohwer, 1915a, p. 445; Middleton, 1915, p. 497; MacGillivray, 1916, p. 64; Ross, 1937b, p. 94; Ross, 1951, p. 61.

Type-species: *Allantus pinguis* Norton. Original designation.

Adult.—Antenna long, somewhat laterally flattened, each segment slightly expanded at its apex; second segment as long as broad; third segment slightly longer than fourth segment; segments beyond third gradually decreasing in length (pl. IV, 67, 68). Clypeus circularly emarginated for about half its medial length; malar space less than diameter of front ocellus; genal carina distinct, extending to top of eye; each mandible bidentate. Mesopleuron and parts of mesonotum, especially mesoscutellum, with large, closely set, coarse punctures; propleurae narrowly truncated on meson. Tarsal claw bifid, basal lobe inconspicuous (pl. IV, 66). Forewing with anal crossvein oblique; vein *M* meeting *Sc* + *R* slightly basad to point where vein *Rs* + *M* meets

Sc + *R*. Hindwing with cells *Rs* and *M* both present; anal cell sessile. Hindwing of male with peripheral vein.

Larva.—Recognized by the presence of four fleshy protuberances at apex of 10th tergum, two fleshy protuberances on posterior margin of 9th tergum, three long protuberances on thorax, and the elongated, oval head as seen in frontal view (pl. V, 74–76).

Discussion.—This exclusively North American genus is near *Eriocampa* but is separated by the longer and usually laterally compressed antennae, which do not have the four apical segments reduced, the bidentate mandibles, the sessile anal cell of the hindwing, and the presence of a peripheral vein in the hindwing of the male. The unique larvae with the long, fleshy protuberances on the thorax and apical abdominal segments are unlike those of any other Allantinae.

A number of species of *Dimorphopteryx* have been described and most are based on slight differences in coloration. The species form a closely knit group with few, if any, differences in genitalia and external characters. The five species recognized here appear distinct enough to be maintained as separate entities, though their status is tenuous. Additional series are needed to reevaluate species separation.

The few larval-adult associations do not permit a key to larvae. The study of available specimens indicates that several units are represented, and these may represent the species involved. These differences are the same as those defined by Middleton (1915), for example, the shape of the head and coloration of the head and body. Because of the uncertain identity of larvae, only that of *virginicus* is described in detail.

Numerous hosts have been recorded for this genus, but host data do not help to clarify the situation. Separation of specimens by host gives a variety of color and morphological forms, and separation by the latter gives a variety of host data. Apparently, most species are polyphagous. *Acer* as a host plant is recorded from larvae and is not repeated under the species treated.

Key to *Dimorphopteryx* Species

Adults

- | | |
|--|---|
| 1. Female | 2 |
| Male | 6 |
| 2. Mesoprescutum and/or mesopleuron orange | 3 |
| Mesoprescutum and mesopleuron black | 4 |

3. Mesoprescutum orange; antenna brown to orange; mesoscutellum strongly convex in profile (pl. IV, 71) ----- *D. abnormis* Rohwer
 Mesoprescutum black; antenna black; mesoscutellum flat (pl. IV, 70) ----- *D. autumnalis* Rohwer
4. Antenna stout, laterally flattened, fourth and fifth segments twice as long as broad or less, usually orange (pl. IV, 67) -----
 ----- *D. pinguis* (Norton)
 Antenna slender, nearly cylindrical in cross section, fourth and fifth segments more than twice as long as broad, usually black (pl. IV, 68) ----- 5
5. Apical two to four abdominal segments black; wings moderately to strongly infuscated, sometimes darker on basal half; each serrula of lancet with an anterior subbasal tooth (pl. IV, 64) --
 ----- *D. melanognathus* Rohwer
 Abdomen orange; wings usually lightly, uniformly, infuscated; each serrula of lancet without an anterior subbasal tooth (pl. IV, 65) -----
 ----- *D. virginicus* Rohwer
6. Mesoscutellum strongly convex in profile (pl. IV, 71); mesoprescutum orange ----- *D. abnormis* Rohwer
 Mesoscutellum flat (pl. IV, 70); mesoprescutum black ----- 7
7. Mesoscutellum black ----- 8
 Mesoscutellum yellow to orange ----- 9
8. Wings moderately to darkly infuscated ----- *D. melanognathus* Rohwer
 Wings clear hyaline ----- *D. virginicus* Rohwer
9. Antenna orange; posterior margin of pronotum broadly orange --
 ----- *D. pinguis* (Norton)
 Antenna brownish; posterior margin of pronotum narrowly orange
 ----- *D. autumnalis* Rohwer

Descriptions of *Dimorphopteryx* Species

Dimorphopteryx abnormis Rohwer

Dimorphopteryx abnormis Rohwer, 1911a, p. 406; Rohwer, 1915a, p. 446; Ross, 1951, p. 61.

Dimorphopteryx desidiosus MacGillivray, 1923d, p. 10; Ross, 1951, p. 61 (= *abnormis* Rohwer).

Dimorphopteryx ithacus MacGillivray, 1923d, p. 10; Ross, 1951, p. 61 (= *abnormis* Rohwer).

Dimorphopteryx salinus MacGillivray, 1923d, p. 11; Ross, 1951, p. 61 (= *abnormis* Rohwer).

Female.—Length, 6.8 to 7.2 mm. Antenna orange to reddish brown. Head black; clypeus and mouthparts except for apex of each mandible orange; labrum white. Thorax black with posterior margin of pronotum, tegulae, mesoprescutum, and sometimes upper portion of mesopleuron orange; mesoscutellum and metascutellum whitish. Legs orange, only extreme apex of hindfemur

and extreme apex of hindtibia black; base of each coxa sometimes black. Abdomen orange; basal plates sometimes black. Wings hyaline; costa of forewing brownish, remaining veins and stigma black.

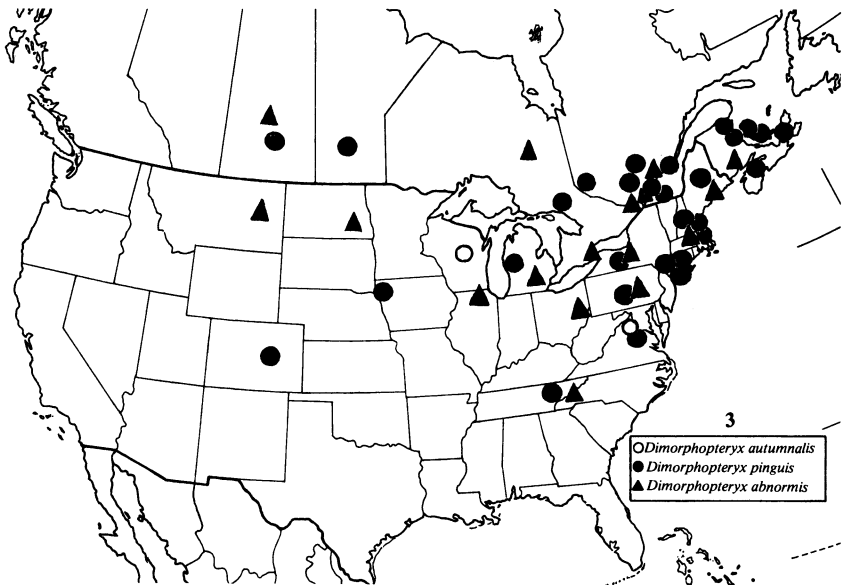
Antenna laterally flattened, fourth and fifth segments two times or less longer than broad. Mesoscutellum protuberant, strongly convex in profile (pl. IV, 71). Sheath straight above and below, rounded at apex. Serrulae of lancet low, each broader than long, flat at apex, with one anterior and two or three posterior subbasal teeth (as in pl. IV, 63).

Male.—Length, 6.3 to 6.7 mm. Coloration and structure similar to those of female. Hindwing with peripheral vein. Parapenis of genitalia triangular; penis valve elongate, rounded at apex, with narrow dorsoapical lobe (as in pl. IV, 72, 73).

Larva.—Not available.

Holotypes.—*D. abnormis* Rohwer: At the U.S. National Museum, type No. 13841, labeled “♀.” Rohwer (1911a) stated that the specimens were bred from larvae on cultivated plum in 1900 at Ottawa, Canada. MacGillivray’s types are at the Illinois Natural History Survey: *D. desidiosus*, ♀, “Black Mt., N.C., May,” “N. Fork Swannanoa.”; *D. ithacus*, ♀, “Ithaca, N.Y., 28 June ’98”; *D. salinus*, ♀, “Salineville, Ohio.”

Distribution.—Eastern North America (fig. 3): New Brunswick, Quebec, Maine, Massachusetts, New York, Pennsylvania,



North Carolina, Ontario, Michigan, Ohio, Illinois, Saskatchewan, North Dakota, Montana.

Hosts.—The following are taken from labels on specimens examined: *Prunus* sp., *Pyrus malus*, *Amelanchier* sp., plum, yellow birch, *Betula lutea*, *Crataegus*.

Biology.—Though a number of specimens have been reared, there is no information associated with them. Most adult collections are from the end of May to the end of June.

Discussion.—The most distinctive feature of this species is the protuberant mesoscutellum, which is strongly raised above the normal convexity of the mesonotum. This as well as the orange mesoprescutum of both sexes should distinguish this species.

Dimorphopteryx autumnalis Rohwer

Dimorphopteryx autumnalis Rohwer, 1915a, p. 447; Middleton, 1915, p. 500; Ross, 1951, p. 61 (= *pinguis* Norton?).

Dimorphopteryx quercivora Rohwer, 1915a, p. 448; Middleton, 1915, p. 500; Ross, 1951, p. 61. New synonymy.

Female.—Length, 7.3 mm. Antenna black to reddish brown. Head black; clypeus, labrum, and mouthparts except for apex of each mandible whitish. Thorax black with posterior margin of pronotum, tegulae, mesoscutellum, and metascutellum whitish; upper half of mesopleuron orange. Legs orange, only extreme base of each coxa black. Abdomen orange, basal plates and sheath black. Wings hyaline to very lightly and uniformly infuscated; costa of forewing brownish, other veins and stigma black.

Antenna laterally flattened; segments 4 and 5 two times or less longer than broad. Mesoscutellum flat. Sheath straight above and below, rounded at apex. Serrulae of lancet low, each about as long as broad, flattened at apex, and with one anterior and three posterior subbasal teeth (as in pl. IV, 63).

Male.—Length, 7.0 mm. Coloration similar to that of female except mesopleuron, which is black. Structure similar to that of female. Hindwing with peripheral vein. Genitalia as in plate IV, 72, 73.

Larva.—Described by Middleton (1915) and separated from *virginicus* by the shape of the head, which, in *autumnalis*, is more rounded at the top in front view and is only faintly colored on top. Middleton separated *autumnalis* and *quercivora* by the white versus slight darkening of the prothoracic protuberances and the distance and shape of the emargination between the protuberances at the apex of the 10th tergum. These do not appear to be specific differences.

Holotypes.—Both at the U.S. National Museum: *D. autumnalis*, type No. 18189, ♀, “10168 Hopk. U.S.,” “reared June 10, ’13,” “Falls Church, Va.” “*Quercus velutina*”; *D. quercivora*, type No. 18188, ♂, “Hopk. U.S. 10171,” “reared June 25, ’13,” “*Quercus rubra*,” “Tomahawk Lk., Wisc.”

Distribution.—Virginia and Wisconsin; same data as on type specimens (fig. 3).

Hosts.—*Quercus velutina* Lam., *Q. rubra* L.

Biology.—According to the brief note by Middleton (1915), larvae appear about the middle of August and usually enter the ground in early October. In rearings, adults emerged during June of the following year. The larvae first feed on the upper surfaces of the leaves but later on the lower surfaces. They are green in the summer, but with the reddening of the “leaf petioles” they become reddish. The type of *quercivora*, reared from oak in Wisconsin, had similar larval feeding and adult emergence times.

Discussion.—I have seen only three specimens, two females from Virginia described as *autumnalis* and one male from Wisconsin described as *quercivora*. Though the sexes can hardly be associated by adults, the larvae as described by Middleton (1915) are remarkably similar, and it is on this basis as well as the similar host that I treat them as the same species.

The orange mesopleuron of the female is unique for this species. The single male is separated by the flat mesoscutellum, black mesoprescutum, pale mesoscutellum, brownish antenna, and the very narrow, not broad, band of orange on the posterior margin of the pronotum.

Dimorphopteryx melanognathus Rohwer

Strongylogaster pinguis: Dyar, 1895c, p. 311; Dyar, 1897b, p. 199.

Dimorphopteryx melanognathus Rohwer, 1910b, p. 205; Rohwer, 1911a, p. 405; Rohwer, 1915a, p. 446; Ross, 1951, p. 61; Raizenne, 1957, p. 39.

Dimorphopteryx errans: Middleton, 1915, p. 501.

Dimorphopteryx enucleatus MacGillivray, 1923d, p. 10; Ross, 1951, p. 61 (= *melanognathus* Rohwer).

Dimorphopteryx scopulosus MacGillivray, 1923d, p. 12; Ross, 1951, p. 61 (= *pinguis* Norton). New synonymy.

Female.—Length, 7.3 to 7.7 mm. Antenna black, sometimes brownish. Head black; labrum and mouthparts except for apex of each mandible dark brown to whitish. Thorax black with tegulae, mesoscutellum, and metascutellum sometimes whitish. Legs orange with forecoxa, base of midcoxa and hindcoxa, and extreme apices of hindfemur and hindtibia black. Abdomen orange with basal plates, apical two to four segments, and sheath black. Wings

darkly to moderately infuscated, sometimes darker on basal half; costa of forewing brownish, other veins and stigma black.

Antenna long, nearly cylindrical in cross section, segments not distinctly expanded at their apices; fourth and fifth segments each more than twice as long as broad (pl. IV, 68). Mesoscutellum flat. Sheath straight above and below, rounded at apex. Serrulae of lancet low, each slightly broader than long, apex flattened, and with one anterior and two or three posterior subbasal teeth (pl. IV, 64).

Male.—Length, 6.0 to 6.4 mm. Coloration similar to that of female except for mesoscutellum and metascutellum, which are black, hindtibia and hindfemur, which are all orange, and abdomen, which has apical two or three segments infuscated with hypandrium black. Structure similar to that of female. Hindwing with peripheral vein. Genitalia as in plate IV, 72, 73.

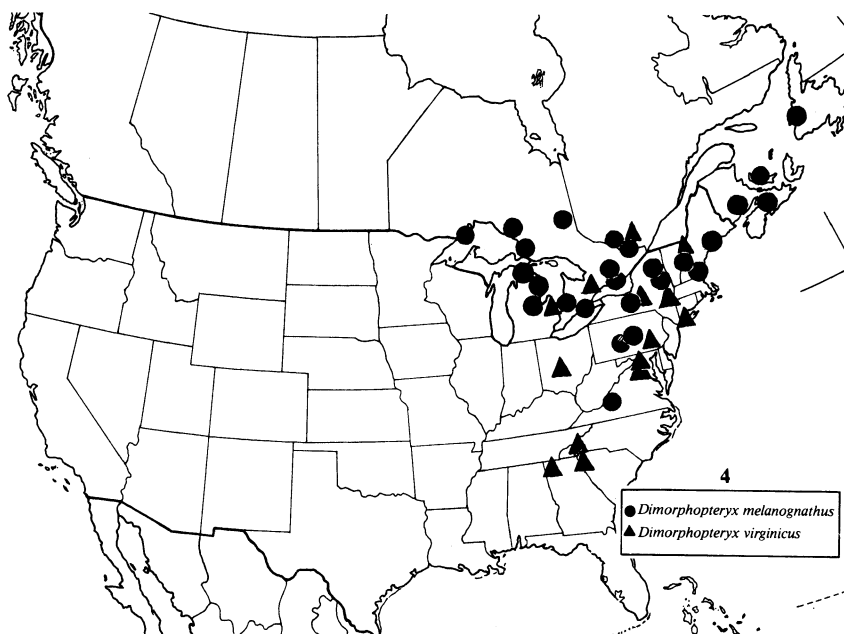
Larva.—Described by Dyar (1895c) under the name *pinguis*. Dyar's description is similar to that described here for *virginicus* except for coloration, the dorsum of the body is paler, and the supraspiracular stripes are more distinct.

Holotype.—*D. melanognathus* Rohwer: At the U.S. National Museum, type No. 12929, ♀, "Nerepis, N.B., 22 Jul.," "A. G. Leavitt, Collector." MacGillivray's types are at the Illinois Natural History Survey: *D. enucleatus*, ♀, "Franconia, N.H."; *D. scopulosus*, ♀, "Fern Rock, Pa., 6-9-05."

Distribution.—Eastern North America (fig. 4): Newfoundland (insular), Prince Edward Island, Nova Scotia, New Brunswick, Quebec, Maine, New Hampshire, New York, Pennsylvania, Virginia, Ontario, Michigan.

Hosts.—Recorded from *Betula papyrifera* Marsh. by Raizenne (1957); according to labels on specimens examined, also reared from *B. alleghaniensis* Britton and *Alnus* sp. Dyar (1895c) reared specimens (labeled "3Y") from birch and linden. He stated "on the birch, sugar plum and maple at Jefferson, Highlands, N.H." The only specimens Dyar reared were those adults labeled "3Y" from New York. The hosts Dyar recorded from New Hampshire were apparently larvae only, and, because of the similarity of larvae of this genus, these hosts must remain questionable.

Biology.—In Ontario and Quebec, Raizenne (1957) found adults in the spring, larvae in early July, and cocoons in early August. Dyar (1895c) stated that eggs are laid under the upper epidermis of the leaf near the middle and that the larvae are solitary, feeding on the undersurface of the leaves. There is probably a single generation a year. Adult collection records range from the middle of June to the middle of August, most of them in July.



Discussion.—The black antennae, black clypeus, and black apical abdominal segments should distinguish this species. Also, the wings are more darkly infuscated than in other species of *Dimorphopteryx*. The more cylindrical antennae with the segments more slender and long is the most consistent morphological character distinguishing the females of *melanognathus* from those of *pinguis*, *abnormis*, and *autumnalis*. From *virginicus*, the female is separated by the presence of an anterior subbasal tooth on each serrula of the lancet and by the black abdominal segments.

The references given in the synonymy to *pinguis* by Dyar and to *errans* by Middleton refer to *melanognathus*.

Dimorphopteryx pinguis (Norton)

Allantus pinguis Norton, 1860, p. 244.

Strongylogaster pinguis: Norton, 1868, p. 218; Provancher, 1878, p. 169; Provancher, 1883, p. 218; Dalla Torre, 1894, p. 137.

Taxonus pinguis: Konow, 1905, p. 109.

Dimorphopteryx pinguis: Ashmead, 1898, p. 308; Rohwer, 1911a, p. 405; Rohwer, 1915a, p. 445; MacGillivray, 1916, p. 64; Ross, 1951, p. 61; Wong, 1954, p. 154; Maxwell, 1955, p. 103.

Sciapteryx punctum Provancher, 1878, p. 72; Cresson, 1880a, p. 40; Provancher, 1883, p. 198; Dalla Torre, 1894, p. 22; Gahan and Rohwer, 1918, p. 171; Ross, 1951, p. 61 (= *pinguis* Norton ?); Smith, 1975b, p. 300 (*puntum* !); synonymy confirmed).

Eriocampa punctum: Konow, 1905, p. 101.

Dimorphopteryx pinguis errans Rohwer, 1911a, p. 406; Ross, 1951, p. 61 (= *pinguis* Norton).

Dimorphopteryx errans: Rohwer, 1915a, p. 446.

Dimorphopteryx coloradensis Rohwer, 1915b, p. 206; Ross, 1951, p. 61 (= *melanognathus* Rohwer?). New synonymy.

Dimorphopteryx oronis MacGillivray, 1923d, p. 11; Ross, 1951, p. 61 (= *melanognathus* Rohwer). New synonymy.

Dimorphopteryx morsei MacGillivray, 1923d, p. 11; Ross, 1951, p. 61 (= *pinguis* Norton).

Female.—Length, 7.6 to 8.0 mm. Antenna dark orange. Head black, anterior half or more of clypeus, all of labrum and mouth-parts except apex of each mandible whitish. Thorax black with broad band on posterior margin of pronotum, tegulae, mesoscutellum, and metascutellum white to reddish brown. Legs white to orange with base of each coxa and extreme apices of hind-femur and hindtibia black. Abdomen orange, basal plates and sheath black. Wings hyaline; costa of forewing brownish, other veins and stigma black.

Antenna laterally compressed, third to eighth segments distinctly widened at their apices; fourth and fifth segments each two times or less longer than broad (pl. IV, 67). Mesoscutellum flat to very slightly convex in lateral view. Sheath straight above and below, broadly rounded at apex (pl. IV, 69). Serrulae of lancet low, each about as broad as long, with one anterior and two or three posterior subbasal teeth, flattened at apex (pl. IV, 63).

Male.—Length, 6.2 to 6.5 mm. Coloration and structure similar to those of female. Hindwing with peripheral vein. Genitalia as in plate IV, 72, 73; similar to other members of the genus.

Larva.—Not available.

Holotypes.—*A. pinguis* Norton: Not located. Rohwer (1915a) designated a neotype in the U.S. National Museum, but I did not find a specimen labeled as such. *S. punctum* Provancher: At the Museum of Quebec, Laval University, ♀, with yellow label "480" and name label "*Sciapteryx punctum* Prov." (Smith, 1975b). Rohwer's types are at the U.S. National Museum: *D. pinguis errans*, type No. 13343, ♀, "Bellport, June 10," "Collection H. G. Dyar"; *D. coloradensis*, type No. 18556, ♀, "El Paso Co., Colo., VI-14-14." MacGillivray's types are at the Illinois Natural History Survey: *D. morsei*, ♀, "Sherborn, Mass., July 25, 1904"; *D. oronis*, ♀, "Orono, Me., July 24, '13."

Distribution.—Eastern North America to Colorado (fig. 3): Nova Scotia, Prince Edward Island, New Brunswick, Quebec,

Maine, New Hampshire, Massachusetts, Connecticut, New York, Pennsylvania, Virginia, Tennessee, Ontario, Michigan, Manitoba (Wong, 1954), Iowa, Saskatchewan (Wong, 1954), Colorado.

Hosts.—From labels on specimens, "*Betula* sp.," "*Alnus incana*." Wong (1954) gave as hosts birch, alder, and saskatoon.

Biology.—In Manitoba and Saskatchewan, Wong (1954) found larvae in early July feeding flat on the leaves. They overwintered in earthen cells in the ground, and there is a single generation a year. Adult specimens have been collected from the end of May to the end of July, with most records in June and July.

Discussion.—From *melanognathus* and *virginicus*, females of *pinguis* may be separated by the orange, distinctly laterally compressed antennae with the third and fourth segments usually less than twice as long as broad at their widest point. The flatter mesoscutellum and black mesoprescutum and mesopleuron will separate *pinguis* from *abnormis* and *autumnalis*.

Part of the type series of *errans* Rohwer is labeled "3Y" (Dyar's code number) and are *melanognathus*. Rohwer's type of *errans* does not bear Dyar's rearing code and was probably a field-collected specimen rather than a reared specimen.

Dimorphopteryx virginicus Rohwer

Dimorphopteryx pinguis virginica Rohwer, 1911a, p. 406; Ross, 1951, p. 61 (= *pinguis* Norton).

Dimorphopteryx virginicus: Rohwer, 1915a, p. 446.

Dimorphopteryx castaneae Rohwer, 1915a, p. 448; Middleton, 1915, p. 498; Ross, 1951, p. 61. New synonymy.

Female.—Length, 7.9 to 8.2 mm. Antenna black, sometimes brownish on ventral surface. Head black with anterior margin of clypeus or only spot on each side of clypeus white; labrum and mouthparts except apex of each mandible whitish. Thorax black with tegulae, mesoscutellum, and metascutellum white. Legs orange, each coxa mostly black with apex white, forefemur and midfemur infuscated to black, extreme apices of hindfemur and hindtibia black. Abdomen orange with basal plates, sheath, and sometimes apical tergum black. Wings hyaline to very lightly uniformly infuscated; costa brownish, other veins and stigma black.

Antenna cylindrical in cross section, not distinctly laterally flattened, segments not distinctly expanded at their apices; fourth and fifth segments each two times or more longer than broad (as in pl. IV, 68). Mesoscutellum flat. Sheath straight above and below, broadly rounded at apex. Serrulae of lancet low, each ser-

rula flat at apex, with no anterior and two prominent posterior subbasal teeth; serrulae farther apart than breadth of one (pl. IV, 65).

Male.—Length, 6.5 to 6.7 mm. Coloration similar to that of female except mesoscutellum, which is black, and legs, which are orange with each coxa black. Structure similar to that of female. Hindwing with peripheral vein. Genitalia as in plate IV, 72, 73.

Larva.—Late feeding stage, 13 to 17 mm long (pl. V, 74). Head amber with dark-brown spot on vertex; eyespots and apex of each mandible black. Body probably green when alive with most of dorsum down to level of spiracles brownish, lateral regions darker than dorsal area.

Head conical in front view, higher than wide (pl. V, 76), with scattered spatulate setae. Clypeus with 4 setae; labrum slightly emarginated, with 6 setae; epipharynx with about 16 spines on each half arranged in arcuate row (pl. V, 78). Left mandible with three ventral teeth, three dorsal teeth, inner tooth broad and truncate, and inner mesial ridge connecting outer dorsal tooth with inner ventral tooth and forming an elevated ridge; right mandible with three ventral teeth, two dorsal teeth, inner tooth truncate, and mesial ridge with two or three teeth located near inner ventral tooth; each mandible with one seta on outer surface (pl. V, 79, 80). Maxillary palpus 4-segmented; second segment with 1 seta, palpifer with 4 setae, stipes with 1 seta; lacinia with row of about 16 spines, inner 1 or 2 spines much larger than others (pl. V, 77). Labial palpus three-segmented; second segment with one seta; submentum with four setae.

Thoracic legs stout, five-segmented. Pronotum with two and mesonotum with one long fleshy protuberances. Abdominal segments 1 to 9 each six-annulate; second and fourth annulets each with one large tubercle on each side near dorsum; venter of first annulet with one tubercle; subspiracular and surpedal lobes each with two tubercles. Apical annulet of ninth segment with two long rounded fleshy protuberances. Apex of 10th tergum with four long pointed fleshy protuberances, inner two longer than outer two (pl. V, 75). Prolegs present but reduced in size on abdominal segments 2 to 8 and 10.

This larva was described by Middleton (1915).

Holotypes.—Rohwer's types are at the U.S. National Museum: *D. pinguis virginica*, type No. 13342, ♀, "Washington, D.C., 22 June," "Collection N. Banks"; *D. castaneae*, type No. 18187, ♀, "Hopk. U.S. 101579," "reared VI-17-13," "Falls Church, Va.," "*Castanea dentata*."

Distribution.—Eastern North America (fig. 4): Quebec, New Hampshire, New York, Pennsylvania, Maryland, District of Columbia, Virginia, North Carolina, South Carolina, Georgia, Ontario, Michigan, Ohio.

Host.—*Castanea dentata* (Marsh.) Borkh.

Biology.—Middleton (1915) gave some brief notes on this species. In Virginia, adults are found in late spring and early summer, and larvae feed from late July to September. The larvae feed first on the upper surface of the leaf but later feed on the lower surface. All adult collection records and dates of emergence from rearings are from the end of May to July.

Discussion.—The black antenna, mostly black clypeus, black mesoprescutum, and usually black forefemur and midfemur will help distinguish this species. The female lancet lacks an anterior subbasal tooth on each serrula, whereas those of other species of *Dimorphopteryx* have a prominent anterior subbasal tooth. The female antennae are more cylindrical than flattened, similar to the antenna of *melanognathus*, but *virginicus* has the apex of the abdomen orange.

Tribe EMPRIINI

Genus EMPRIA Lepeletier

Empria Lepeletier, 1828, p. 571; Enslin, 1914, p. 209; MacGillivray, 1916, p. 48; Ross, 1936, p. 172; Ross, 1937b, p. 90; Benson, 1938a, p. 181; Conde, 1940, p. 162; Hellén, 1940, p. 1; Ross, 1951, p. 55; Benson, 1952, p. 85; Takeuchi, 1952, p. 36; Lorenz and Kraus, 1957, p. 91.

Type-species: *Dolerus* (*Empria*) *pallimacula* Lepeletier. Designated by Brullé, 1846.

Poecilostoma Dahlbom, 1835, p. 13; Dalla Torre, 1894, p. 125; Enslin, 1914, p. 209 (= *Empria* Lepeletier).

Type-species: *Tenthredo guttatum* Fallén. Designated by Rohwer, 1911b.

Prosecria Gistel, 1848, p. 10. Unnecessary new name for *Poecilostoma* Dahlbom.

Poecilosoma Thomson, 1870, p. 265; Konow, 1896, p. 51; Konow, 1905, p. 102.

Emendation. Preoccupied by *Poecilosoma* Huebner, 1819, and four others.

Poecilostomidea Ashmead, 1898, p. 256; Ross, 1936, p. 174 (= *Empria* Lepeletier).

Type-species: *Emphytus maculatus* Norton. Original designation.

Tetraneura Ashmead, 1898, p. 256; Ross, 1936, p. 174 (= *Empria* Lepeletier).

Type-species: *Selandria ignotus* Norton. Original designation.

Tetraneura Konow, 1905, p. 102. Emendation. Preoccupied by *Tetraneura* Hartig, 1814.

Parataxonius MacGillivray, 1908, p. 367; Ross, 1936, p. 177 (as a subgenus); Ross, 1951, p. 56 (as a subgenus of *Empria*).

Type-species: *Taxonius multicolor* Norton. Original designation.

Leucempria Enslin, 1913, p. 187; Ross, 1936, p. 177 (= *Parataxonus* MacGillivray).

Type-species: *Tenthredo candidata* Fallén. Original designation.

Empria subgenus *Triempria* Enslin, 1914, p. 213; Ross, 1936, p. 174 (= *Empria* Lepeletier).

Type-species: *Empria tridens* Konow. Original designation.

Adult.—Second antennal segment slightly longer than broad, third segment slightly longer than fourth segment, segments beyond third gradually decreasing in length (pl. V, 87, 88). Clypeus shallowly to moderately emarginated, but not for more than one-third its medial length, with or without a median longitudinal keel or carina (pl. V, 82–86); malar space broad, nearly twice diameter of front ocellus; genal carina present, usually extending to top of eye; each mandible bidentate. Tarsal claw with or without an inner tooth, basal lobe absent. Forewing with anal crossvein oblique, veins *M* and *Rs* + *M* meeting *Sc* + *R* at same point; first free sector of vein *Rs* present or absent, therefore either four or three cubital cells, respectively. Hindwing with cell *Rs* absent, cell *M* present or absent, anal cell petiolate. Male without peripheral vein in hindwing. Abdomen with paired opalescent white spots on terga 2 to 5 or more (not always obvious in *eosa*, n. sp.) (pl. V, 81).

Larva.—Characterized by the ornamentation of the annulets of abdominal segments 1 to 9: Annulet 1 with setae only; annulets 2 and 4 each with setae and small tubercles (pl. IX, 120). *Allantus* is the only other genus in this subfamily to have ornamentation on the first annulet, but larvae of *Allantus* have tubercles in addition to setae on the first annulet.

Discussion.—Members of this genus are most easily recognized by the presence of paired white spots on the terga of the abdomen. About 35 species are known, most of which are found in the northern temperate regions of the world.

My results essentially coincide with Ross' (1936) treatment of *Empria*. Examination of genitalia is the most reliable means for identification of species. Variation in the coloration of the head and legs and in the sculpturation and texture of the head resulted in the description of the many forms now placed in synonymy. Benson (1938a, 1952) freely utilized external characters for separation of the British species, for example, coloration of legs, number of terga of abdomen with white spots, distance of ocelli from hindmargin of head, length of antennae, and depth of emargination of the clypeus. A certain percentage of North American species could also be separated by using some of these characters, but I have checked well over a thousand specimens from coast to

coast and Alaska to Mexico and found too much external variation to make these characters useful. The genitalia, however, are relatively stable within wide ranging species.

I have not retained subgenera as recognized by Ross (1936, 1951). Ross assigned the species *multicolor* to the subgenus *Parataxonius* (= *Leucempria* Enslin), and *candidata* would also belong here. The main characters for differentiation are the absence of cell *M* in the hindwing, the flat clypeus which lacks a median keel, and the white or yellowish orbits. The larvae of both subgenera are similar, and the degree of differentiation among members of the typical subgenus is just as great as between the two subgenera; therefore, I see no reason to make a division for these species.

Most *Empria* are associated with rosaceous plants, such as *Fragaria*, *Potentilla*, and *Rubus*, though some feed on *Betula*, *Alnus*, *Corylus*, and *Salix*. All species for which the biology is known have a single generation a year, the adults appearing in the spring and the larvae overwintering in an earthen cell in the ground. All larvae are external leaf feeders. Several species are known to be pests of strawberries.

Keys to *Empria* Species

Adults

- | | |
|---|----|
| 1. Female ----- | 2 |
| Male ----- | 13 |
| 2. Mesepisternum with white or yellowish spot or stripe ----- | 3 |
| Mesepisternum black ----- | 5 |
| 3. Clypeus and head black; cell <i>M</i> of hindwing present ----- | |
| ----- <i>E. coryli</i> (Dyar) (pt.) | |
| Clypeus white or yellow; orbits entirely or partly white or yellow; cell <i>M</i> of hindwing absent ----- | 4 |
| 4. Tarsal claw with long inner tooth; clypeus emarginated for about one-third its medial length (pl. V, 86); postocellar area as long as broad ----- | |
| ----- <i>E. multicolor</i> (Norton) | |
| Tarsal claw simple or with minute inner tooth; clypeus shallowly emarginated for less than one-third its medial length (pl. V, 85); postocellar area twice as broad as long --- | |
| ----- <i>E. candidata</i> (Fallén) | |
| 5. Serrulae of lancet long and sharp on apical portion, absent on basal portion; lancet slender, well sclerotized (pl. VI, 95) ----- | |
| ----- <i>E. maculata</i> (Norton) | |
| Serrulae of lancet short, low, or rounded, present on each segment of lancet; lancet broader, not well sclerotized ----- | 6 |
| 6. Serrulae of lancet deep, lobelike, rounded at apices (pl. VI, 89, 93, 94) ----- | 7 |
| Serrulae of lancet low, rounded or flat at apices (pl. VI, 91, 92; pl. VII, 96, 97, 99) ----- | 9 |

7. Serrulae of lancet broad, close together, with few or no subbasal teeth (pl. VI, 93); [tarsal claw with minute inner tooth; legs usually mostly black] ----- *E. ignota* (Norton)
 Serrulae of lancet slender, far apart, with many small posterior subbasal teeth (pl. VI, 89, 94); tarsal claw with long or small inner tooth; legs white and black or dark orange ----- 8
8. Serrulae broadly rounded, directed anteriorly (pl. VI, 89); tarsal claw with smaller inner tooth; legs mostly white and black ----
 ----- *E. alpina* Benson
 Serrulae slender, straight (pl. VI, 94); legs commonly dark orange; tarsal claw with long inner tooth ----- *E. improba* (Cresson)
9. Lancet bare, without short hairs separating segments, long and slender with serrulae flat (pl. VII, 97) ----- *E. nordica* (Ross)
 Lancet with row of short hairs separating segments, broader and serrulae more rounded (pl. VI, 91, 92; pl. VII, 96, 99) ----- 10
10. Serrulae directed anteriorly, without subbasal teeth (pl. VI, 91)
 ----- *E. coryli* (Dyar) (pt.)
 Serrulae directed ventrally, with distinct subbasal teeth (pl. VI, 92; pl. VII, 96, 99) ----- 11
11. Antenna long, more than twice head width, segments 5 to 8 each $2\frac{1}{2}$ times or more longer than broad; paired white spots on abdomen sometimes not discernible; lancet as in plate VI, 92
 ----- *E. eosa*, n. sp.
 Antenna stouter, its length about two times head width, segments 5 to 8 about two times longer than broad; paired white spots of abdomen obvious ----- 12
12. Anterior subbasal tooth of each serrula small (pl. VII, 99) ----
 ----- *E. obscurata* (Cresson)
 Anterior subbasal tooth of each serrula large, appearing as a step between serrula and ventral margin of lancet (pl. VII, 96) ----
 ----- *E. mexicana* (Cameron)
13. Orbits partly or entirely white or yellow ----- 14
 Head black ----- 15
14. Tarsal claw with long inner tooth; clypeus emarginated for about one-third its medial length (pl. V, 86); abdomen frequently orange to yellow ----- *E. multicolor* (Norton)
 Tarsal claw simple or with minute inner tooth; clypeus shallowly emarginated for less than one-third its medial length (pl. V, 85); abdomen mostly black ----- *E. candidata* (Fallén)
15. Apex of penis valve extended into a long slender spine (pl. VII, 105) ----- *E. improba* (Cresson)
 Penis valve without such a spine, rounded at apex ----- 16
16. Penis valve without a spine or toothlike process near apex (pl. VII, 103; pl. VIII, 114) ----- 17
 Penis valve with a short spine or toothlike process near apex (pl. VIII, 107, 108, 109, 111, 116) ----- 18
17. Penis valve rounded on dorsum (pl. VIII, 114) ----- *E. alpina* Benson
 Penis valve irregularly shaped on dorsum (pl. VII, 103) ----
 ----- *E. coryli* (Dyar)
18. Dorsoapical spine of penis valve long, valve rather slender (pl. VIII, 116) ----- *E. ignota* (Norton)
 Dorsoapical spine of penis valve short, valve more triangular in shape (pl. VIII, 107, 108, 109, 111) ----- 19

19. Apex of penis valve with strongly projecting, rounded ventro-apical lobe (pl. VIII, 107) ----- *E. obscurata* (Cresson)
 Penis valve straighter, without such a lobe (pl. VIII, 108, 109, 111) ----- 20
20. Dorsal lobe of penis valve rather acute (pl. VIII, 109) -----
 ----- *E. maculata* (Norton)
 Dorsal lobe of penis valve more broadly rounded (pl. VIII, 108, 111) ----- 21
21. Penis valve broader, more nearly triangular (pl. VIII, 111) -----
 ----- *E. eosa*, n. sp.
 Penis valve more slender, rather oblong (pl. VIII, 108) -----
 ----- *E. mexicana* (Cameron)

Larvae

1. Head amber, no brown spots on vertex or behind eyes; body unicolorous; on *Fragaria* ----- *E. obscurata* (Cresson)
 Head with a brown spot on vertex and one behind each eye; body unicolorous or with brown longitudinal stripes ----- 2
2. Body unicolorous, without brown stripes; on *Fragaria*, *Potentilla*, *Rubus* ----- *E. maculata* (Norton)
 Body with dark-brown longitudinal stripes ----- 3
3. On *Corylus* ----- *E. coryli* (Dyar)
 On *Betula* or *Alnus* ----- 4
4. Dark-brown subspiracular stripe on body; 10th tergum unicolorous; on *Betula* ----- *E. candidata* (Fallén)
 Subspiracular stripe faint or absent; only apex of 10th tergum dark brown (pl. IX, 119); on *Betula* and *Alnus* ---- *E. multicolor* (Norton)

Descriptions of *Empria* Species

Empria alpina Benson

Empria alpina Benson, 1938a, p. 190; Hellén, 1940, p. 6; Benson, 1952, p. 89; Pasteels, 1958, p. 70; Hellén, 1960, p. 153.

Female.—Length, 5.5 to 6.0 mm. Head black; labrum, maxillary and labial palpi, and sometimes anterior third of clypeus white; antenna black. Thorax black with posterior margin of pronotum and anterior edge of tegulae usually whitish though sometimes brownish. Legs whitish to yellowish with each coxa, each trochanter, basal quarter of forefemur and midfemur, basal two-thirds of hindfemur, foretarsus and midtarsus, apical two-thirds of hindtibia, and all of hindtarsus black. Abdomen black with paired white spots on terga 2 to 7. Wings hyaline to very lightly infuscated; veins and stigma black.

Length of antenna slightly less than two times width of head.

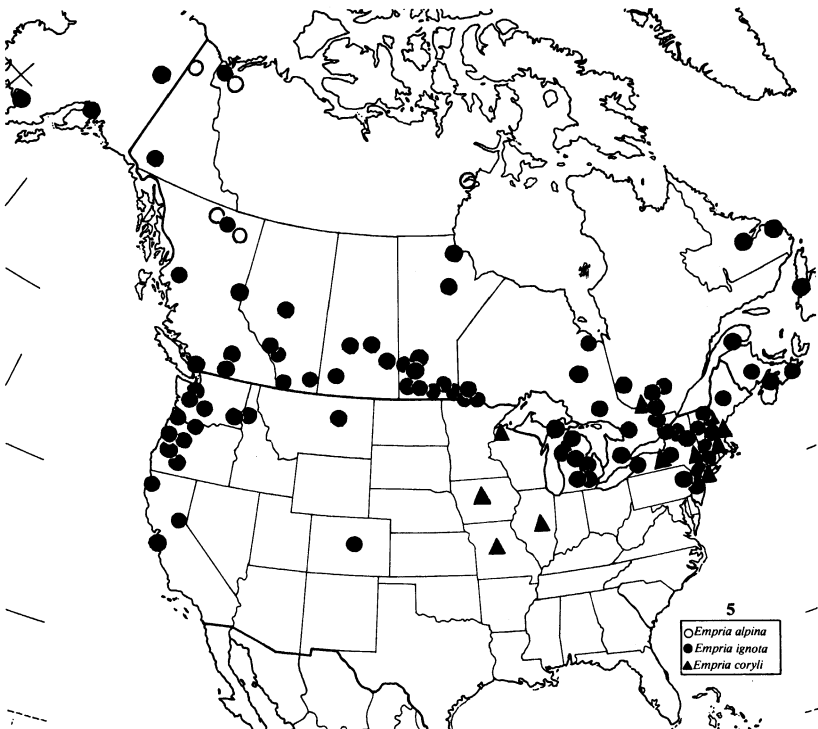
Clypeus emarginated with tooth at center; genal carina extending to top of eyes; postocellar area broader than long. Tarsal claw with small inner tooth. Forewing with vein $1r-m$ absent; hindwing with cell M present. Sheath straight above, rounded below and at apex. Lancet with long, lobelike serrulae, directed anteriorly and each separated from ventral margin of lancet by distinct notch, posteriorly with three or four coarse subbasal teeth (pl. VI, 89).

Male.—Length, 5.4 to 5.9 mm. Coloration as for female except clypeus, pronotum, tegulae, and legs, which are more commonly black and paired white spots only on terga 2 to 5 or 6. Structure as for that of female. Harpe and parapenis similar to those of *ignota* (pl. VIII, 115); penis valve triangular in shape, without an apical spine (pl. VIII, 114).

Larva.—Unknown.

Holotype.—At the British Museum of Natural History, London. The species was described from Scotland.

Distribution.—Scotland, Belgium, Finland. The following specimens from North America (fig. 5) are all in the Canadian Na-



tional Collection: NORTHWEST TERRITORIES: Chesterfield, 2-VIII-1960, 30-VI-1960; Aklavik, 30-VI-1956. YUKON TERRITORY: Rampart House, 28-V-1951. BRITISH COLUMBIA: Toad River, Mi 440 Alaska Hwy., 19-VI-1959, 4,500'; Summit Lake, Mi 392 Alaska Hwy., 25-27-VI-1959, 4,500'.

Host.—Unknown. Adults of the type series were taken from *Salix*.

Biology.—Unknown.

Discussion.—The male is easily separated from other North American species by the lack of a spine on the penis valve. Though the valves of *coryli* and *candidata* also lack a spine, that of *coryli* is more oblong and that of *candidata* is rectangular. The female is most likely to be confused with *ignota*, which also has long lobelike serrulae, but the serrulae of *ignota* are more elongate and those of *alpina* more rounded with a distinct notch on the anterior base and with coarser posterior subbasal teeth.

Empria candidata (Fallén)

Tenthredo candidata Fallén, 1808, p. 105.

Poecilosoma candidata: Brischke and Zaddach, 1883, p. 288; Konow, 1905, p. 102.

Poecilostoma candidatum: Dalla Torre, 1894, p. 125, gives references to this species in European literature prior to 1894.

Leuceempria candidata: Enslin, 1914, p. 209; Forsius, 1928, p. 46; Malaise, 1931a, p. 58; Malaise, 1932, p. 22; Conde, 1934, p. 178.

Empria candidata: Obarski, 1934, p. 157; Benson, 1938a, p. 194; Hellén, 1940, p. 4; Benson, 1952, p. 87; Lorenz and Kraus, 1957, p. 92; Benson, 1962, p. 390; Verzhutskii, 1966, p. 73; Burks, 1967, p. 25.

Female.—Length, 6.2 to 6.6 mm. Antenna black. Head black with band or small spot on inner orbits, outer orbits, malar space, and clypeus white; labrum and mouthparts whitish. Thorax black with posterior margin of pronotum, tegulae, and large spot on lower portion or mesepisternum white. Legs mostly white with each tarsus, base of each coxa and each femur blackish; outer surface of each tibia sometimes black and apex of each femur and each basitarsus sometimes whitish. Abdomen black with narrow to wide white band on posterior margin of each segment; paired white spots usually on terga 2 to 5; reddish brown sometimes suffused with black on abdomen. Wings hyaline to very lightly, uniformly infuscated; veins and stigma black.

Clypeus shallowly emarginated, without median keel (pl. V, 85); genal carina not extending to top of eye; postocellar area twice as broad as long; head moderately shining. Tarsal claw

simple or with minute inner tooth. Forewing with first sector of *Rs* present, therefore with four cubital cells. Hindwing without cell *M*. Sheath broadly rounded at apex. Lancet with row of hairs separating segments; each serrula low and flat with 1 prominent anterior and 8 to 10 small posterior subbasal teeth (pl. VI, 90).

Male.—Length, 6.0 mm. Coloration and structure similar to those of female. Genitalia with parapenis long, penis valve rectangular with short dorsoapical spine (pl. VIII, 117, 118).

Larva.—Not examined, but described by Lorenz and Kraus (1957) and Brischke and Zaddach (1883). The illustration by Brischke and Zaddach shows the following color pattern: Head amber with dark-brown spot on vertex and dark-brown spot posterior to each eye; dorsum of body dark brown with area below spiracles and venter green. The description by Lorenz and Kraus is similar except for a brown subspiracular stripe. The following additional characters are from Lorenz and Kraus: Clypeus with 4 setae, labrum with 6 setae, maxillary palpi 4-segmented with 1 seta on second segment; abdominal segments 1 to 9 each with 4 setae on each side of first annulet, setae and 4 tubercles on each side of second annulet, and setae and 4 or 5 tubercles on each side of fourth annulet; subspiracular and surpedal lobes each with about 10 setae.

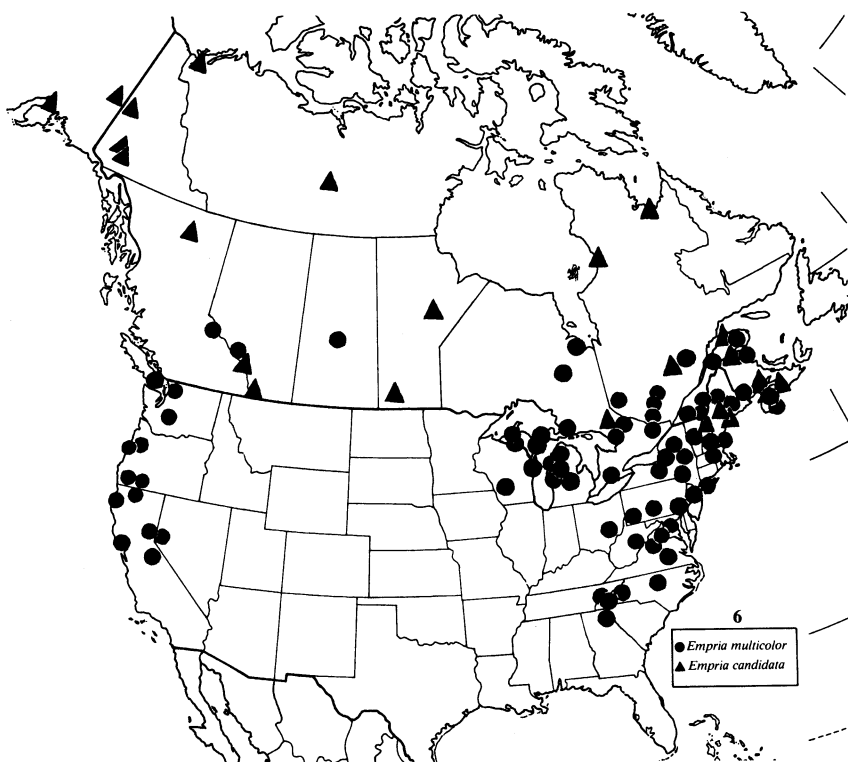
Holotype.—At the Zoological Museum, Lund, Sweden.

Distribution.—Transcontinental across Canada to Alaska, entering the United States in the New England States (fig. 6); England, north and central Europe to Siberia. I have seen specimens from the following States and Provinces: Nova Scotia, New Brunswick, Quebec, Maine, New Hampshire, Ontario, Northwest Territories, Manitoba, Alberta, Yukon Territory, Alaska, British Columbia.

Host.—*Betula* spp.

Biology.—Brischke and Zaddach (1883) and Enslin (1914) stated that adults appear in spring, larvae in the summer, and pupae overwinter in the ground. There is one generation a year. The larvae feed on the foliage of the host. Adult collection records in North America are from the end of May to the first of July. Verzhutskii (1966) described its biology in Siberia.

Discussion.—With the whitish areas on the head and mesepisternum, this species resembles *multicolor*, but *candidata* has a shallowly emarginated clypeus, very small or no inner tooth to the tarsal claws, and usually white rather than yellow pale markings. The larva may be separated by the host and those characters given in the preceding key to larvae.



Benson (1962) first recorded *candidata* in North America. Because of its extensive distribution, it is undoubtedly a true Holarctic species.

Enslin (1914) treated *Tenthredo repanda* Klug as a synonym of *candidata* in Europe.

Empria coryli (Dyar)

"5F" Dyar, 1895b, p. 339.

Harpiphorus maculatus var. *coryli* Dyar, 1897b, p. 194.

Empria coryli: Ross, 1936, p. 176; Ross, 1951, p. 55; Burks, 1958, p. 14.

Empria mellipes Rohwer, 1910a, p. 175; Ross, 1936, p. 176 (= *coryli* Dyar).

Empria caetrata MacGillivray, 1911a, p. 305; MacGillivray, 1916, p. 55; Ross, 1936, p. 176 (= *coryli* Dyar).

Female.—Length, 6.1 to 6.4 mm. Antenna and head black; labrum and maxillary and labial palpi whitish. Thorax black with posterior margin of pronotum and tegulae white; stripe on upper posterior margin of mesepisternum whitish to reddish brown. Legs whitish to reddish brown with each coxa except for extreme

apex black; each tarsus blackish. Abdomen black, suffused with brown at apex and on venter; paired white spots on terga 2 to 6 or 7; narrow white band on posterior margin of each segment. Wings hyaline to very lightly, uniformly infuscated; veins and stigma black.

Clypeus nearly truncate, with slight median keel (pl. V, 82); genal carina extending to top of eye; postocellar twice as broad as long; head texture dull. Tarsal claw with minute inner tooth. Forewing with first sector of *Rs* present, therefore with four cubital cells. Cell *M* of hindwing present. Sheath rounded at apex. Segments of lancet separated by row of fine hairs; serrulae low, each directed anteriorly and without subbasal teeth (pl. VI, 91).

Male.—Length, 5.3 mm. Coloration similar to that of female except mesepisternum, which is black. Structure similar to that of female. Penis valve oblong, without apical spine or toothlike process (pl. VII, 102, 103).

Larva.—Described by Dyar (1897b) as follows: "Head faintly testaceous, a diffuse leaden black patch on the vertex behind; eye in a black spot; width 1.2 mm. The black spot reaches well down the side of the head, but the whole face is pale; a trace of white bloom. Dorsum gray to spiracles, uniform or centrally dorsally on abdomen nearly white; subventral region white; a gentle white bloom; feet colorless. Segments 6-annulate. Joint 2 and the anal flap white. No points on the body and no spots." There are probably small tubercles and setae on the body as for other *Empria* larvae that Dyar did not see. I saw one specimen, an inflated larva from *Corylus* from Massachusetts. It agrees with Dyar's description except the head, which is entirely amber.

Holotypes.—*H. maculatus* var. *coryli* Dyar: Described from larvae and larvae not located. The application of the name *coryli* is based on adults labeled "5F" reared from the larvae that Dyar described. Dyar's "5F" is from Plattsburgh and VanCortlandt Park, N.Y. *E. mellipes* Rohwer: At the U.S. National Museum, type No. 12340, ♀, labeled "No. 9 saw," "Storm [?] Apr. 14/71," "C. Mo." *E. caetrata* MacGillivray: At the Illinois Natural History Survey, ♀, "Ames, Ia., 4-21-96."

Distribution.—Eastern North America (fig. 5): Quebec, New Hampshire, Massachusetts, New York, Wisconsin, Illinois, Iowa, Missouri.

Host.—*Corylus* sp.

Biology.—According to Dyar (1897b), there is one generation a year "disappearing before the middle of June." The larvae are solitary feeders on the underside of the leaves. Dyar collected the

larvae on June 9, 1895, and adults emerged the first part of April 1896.

Discussion.—The black head and pale spot on the mesepisternum will distinguish the female of this species. Occasionally this pale spot is difficult to see since its darkness varies; nevertheless, the rounded serrulae of the lancet and lack of subbasal teeth on the serrulae are unique for *coryli*. The male always lacks the white spot on the mesepisternum, but the penis valve is distinctive in lacking a tooth or spine at its apex and in being more oblong and with a more irregular dorsal margin than that of *alpina*.

The reference to "5F" by Dyar (1895b) is *coryli*.

Empria eosa, new species

Female.—Length, 6.8 to 7.0 mm. Antenna and head black, labrum brownish. Thorax black with posterior margin of pronotum brownish; sometimes small white spot on anterior edge of tegulae. Legs black with extreme apex of forefemur and all foretibia entirely white. Abdomen black, posterior margin of each segment sometimes with narrow white band; paired white spots absent, at most represented by brownish areas on segments 2 to 7. Wings darkly, uniformly infuscated; veins and stigma black.

Antenna long, slender, more than two times width of head; seventh and eighth segments each $2\frac{1}{2}$ times or more longer than broad (pl. V, 88). Clypeus shallowly emarginated, with median keel; genal carina extending to top of eye; postocellar area twice as broad as long; head moderately shining. Tarsal claw with small inner tooth. First free sector of *Rs* in forewing present. Cell *M* present in hindwing. Sheath straight above, rounded below and at apex. Serrulae of lancet low, rounded, with one anterior subbasal tooth near base and five fine posterior subbasal teeth; segments separated by rows of fine hairs (pl. VI, 92).

Male.—Length, 6.6 to 6.8 mm. Coloration similar to that of female. Antenna slightly longer in relation to head width and slightly laterally compressed. Harpe and parapenis as in plate VIII, 110, with parapenis rounded on inner margin and with short dorsal lobe; penis valve broad, triangular, similar to that of *obscurata* but straighter and without protruding ventroapical lobe (pl. VIII, 111).

Holotype.—Female, "Tancitaro, Michoacan, Mexico, Alt. 11,000 ft., Hy. 58, July 19, 1940, on Teasel, Hoogstraal and Knight." At the Illinois Natural History Survey.

Paratypes.—JALISCO: 4 miles SW. Tuxpan, VIII-19-66, P.M. and P. K. Wagner (1 ♀). MEXICO: 22 miles W. Toluca, VII-

16-66, P. M. and P. K. Wagner (1 ♀); Toluca, 10 mi. E., 8,900', 31-VII-1954, J. G. Chillcott (1 ♀, 2 ♂♂); 9,600 ft, W. slope Popocatepetl, VII-5-51, H. E. Evans, collector (1 ♀, 1 ♂), same data, 6-22-59, 10,000', H. E. Evans (2 ♀♀). MICHOACAN: Same data as for holotype (6 ♀♀, 1 ♂); same data as for holotype except 9,000', Hy. 56, on thistle (1 ♀); same data as for holotype except 6,600 ft, Hy. 62, July 23, 1940, sweeping herbs (1 ♀); same data as for holotype except 8,600 ft, July 23, 1940, no hy. number, and swept from mt. meadow (1 ♀); Cerro Tancitaro, Alt. 7,800 ft, mt. meadow, 7-9-41, Hoogstraal (1 ♀, 1 ♂), same data, 7-7-41 (1 ♂), same data, 7-8-41 (1 ♀, 2 ♂♂), same data, on Lupine, 6-30-41 (1 ♀), same data, 10,500 ft, open pine, 7-18-41 (1 ♂); Cerro Tancitaro, Alt. 11,500 ft, July 18, 1941, in grass, coll. H. Hoogstraal (1 ♀, head missing). MORELOS: Mts. near Cuernavaca, Crawfo. (2 ♂♂). VERACRUZ: N.E. Citlaltepetl, VI-27-64, el. 11,000, L. W. Swan (10 ♀♀, 6 ♂♂); Citlaltepetl, 26 Jun '14, el. 11,100, L. W. Swan (1 ♀). State unknown: Meadow Vy., Mex., collector Townsend (1 ♂). At the Illinois Natural History Survey, U.S. National Museum, California Academy of Sciences, Canadian National Collection, Texas A. and M. University, and Cornell University.

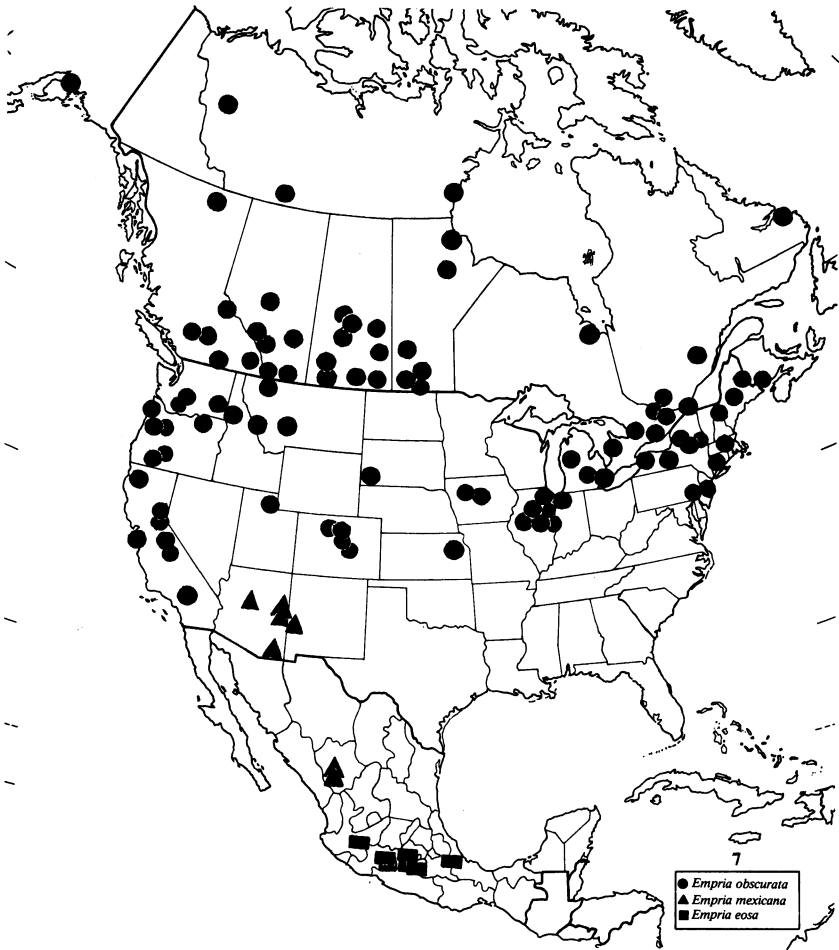
Distribution.—South-central Mexico (fig. 7).

Host.—Unknown except for preceding collection records.

Biology.—Unknown.

Discussion.—This species resembles *obscurata*, the female lancet being almost identical, but the male penis valve is not quite so broad and is without a protuberant ventroapical lobe. The longer and more slender antennae will distinguish *eosa* from *obscurata*; the antennae of the former are two times or more the head width, and the seventh and eighth segments are $2\frac{1}{2}$ times or more longer than broad, similar to the antennae of *improba*. The lack of distinct opalescent spots on the abdomen of *eosa* is another feature that will aid in its separation. The abdomen may be entirely dark or with only brownish spots where the white ones are normally found in *Empria* species. Because the presence of opalescent spots on the abdomen is a significant character used to separate *Empria*, other structural features must sometimes be used to place *eosa* in this genus. The only other Allantinae found in this part of Mexico are species of *Amestegia*, which lack cell *M* in the hindwing and have the anal cross-vein of the forewing more perpendicular than does *Empria*.

The species name is an arbitrary combination of letters and is to be treated as a noun.



Empria ignota (Norton)

Selandria ignotus Norton, 1867, p. 257; Provancher, 1878, p. 100, 202.

Monostegia ignota: Provancher, 1888, p. 351.

Eriocampa ignota: Della Torre, 1894, p. 130.

Poecilosoma ignota: Konow, 1905, p. 103.

Empria ignota: MacGillivray, 1916, p. 55; Ross, 1936, p. 174; Ross, 1951, p. 55.

Monostegia kincaidi MacGillivray, 1893, p. 239; Ross, 1936, p. 174 (= *ignota* Norton).

Poecilosoma kincaidi: Konow, 1905, p. 103.

Empria calda MacGillivray, 1911a, p. 307; MacGillivray, 1916, p. 55; Ross, 1936, p. 74 (= *ignota* Norton).

Empria cata MacGillivray, 1911a, p. 307; MacGillivray, 1916, p. 55; Ross, 1936, p. 174 (= *ignota* Norton).

- Empria castigata* MacGillivray, 1911a, p. 309; MacGillivray, 1916, p. 55; Ross, 1936, p. 174 (= *ignota* Norton).
- Empria casca* MacGillivray, 1911a, p. 310; MacGillivray, 1916, p. 55; Ross, 1936, p. 174 (= *ignota* Norton).
- Empria evecta* MacGillivray, 1911a, p. 310; MacGillivray, 1916, p. 55; Ross, 1936, p. 174 (= *ignota* Norton).
- Empria confirmata* MacGillivray, 1911b, p. 341; Ross, 1936, p. 174 (= *ignota* Norton).
- Empria concitata* MacGillivray, 1911b, p. 342; Ross, 1936, p. 174 (= *ignota* Norton).
- Empria culpata* MacGillivray, 1911b, p. 343; Ross, 1936, p. 174 (= *ignota* Norton).
- Empria cerina* MacGillivray, 1921, p. 34; Ross, 1936, p. 174 (= *ignota* Norton).
- Empria cirrha* MacGillivray, 1923d, p. 16; Ross, 1936, p. 174 (= *ignota* Norton).
- Empria cithara* MacGillivray, 1923d, p. 17; Ross, 1936, p. 174 (= *ignota* Norton).

Female.—Length, 5.8 to 6.3 mm. Antenna and head black; labrum sometimes brownish. Thorax black with posterior margin of pronotum white; tegulae white, partly white, or black. Legs mostly black with all or only inner surface of each tibia whitish and base of hindtibia whitish. Abdomen black with narrow white band on posterior margin of each segment; paired white spots on terga 2 to 5 or 6. Wings lightly, uniformly infuscated; veins and stigma black.

Clypeus shallowly emarginated, with median keel; genal carina extending to top of eye; postocellar area twice as broad as long; head texture dull. Tarsal claw with minute inner tooth. First free sector of *Rs* present in forewing. Cell *M* present in hindwing. Sheath narrow and rounded at apex. Serrulae of lancet each as long as broad, directed ventrally, broadly rounded at apex, and with few inconspicuous subbasal teeth; serrulae closer together than in *improba*; serrulae not set off from ventral margin of lancet by small notch (pl. VI, 93).

Male.—Length, 5.2 to 5.6 mm. Coloration and structure similar to those of female. Penis valve without protuberant dorsal lobe; dorsoapical spine present (pl. VIII, 115, 116).

Larva.—Unknown. Those described in the literature as *ignota* are here referred to *Empria obscurata*.

Holotypes.—*S. ignotus* Norton: At the Academy of Natural Sciences of Philadelphia, type No. 10342, ♀, labeled "Me." MacGillivray's types are at the Illinois Natural History Survey: *M. kincaidi*, ♀, "5-7-92," "Olympia, Wash.," "T. Kincaid, collector"; *E. calda*, ♀, "Durham, N.H., VI-1904," "J. C. Bridwell, collector";

E. cata, ♂, "Mt. Wash., N.H. 2641," "WFF"; *E. castigata*, ♀, "Battle Creek, Mich."; *E. casca*, ♂, "New Haven, Ct., 24 May 1905, W. E. Britton"; *E. eucta*, ♀, "Sandy Pk., N.J."; *E. confirmata*, ♀, "catkin of *Salix flavescens*," "4-17-92," "Olympia, Wash.," "T. Kincaid, collector"; *E. concitata*, ♂, "5-7-93," "Olympia, Wash.," "T. Kincaid, collector"; *E. culpata*, ♀, "Olympia, Wash.," "5-8-96"; *E. cerina*, ♀, (no locality on label; described from Ithaca, N.Y.), "107-5-2," "May 26, 1919,"; *E. cirrha*, ♀, "Marys Peak, 5-30," "Ballard, collector"; *E. cithara*, ♀, "Marys Peak, Or., May 19, 1912," "L. G. Gentner, collector."

Distribution.—Transcontinental in Canada and northern United States (fig. 5): Newfoundland (Labrador and insular), Nova Scotia, New Brunswick, Quebec, Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Ontario, New York, New Jersey, Pennsylvania, Michigan, Manitoba, Saskatchewan, Montana, Colorado, Northwest Territories, Alberta, Idaho, Yukon Territory, Alaska, British Columbia, Washington, Oregon, California.

Host.—Unknown. Adults have been captured from *Salix* catkins, from flowers of *Rosa*, and from *Barbarea vulgaris* R. Br.

Biology.—Unknown. Dates of capture for adults range from the middle of April to the first of July with most in May and June.

Discussion.—This species has long, lobelike serrulae as does *improba*, but the serrulae of *ignota* are broader, closer together, and not separated from the ventral margin of the lancet by a notch. The male penis valve of *improba* is extended into a long spine, whereas that of *ignota* is rounded at its apex.

Benson (1938a) believed that the Palearctic *Empria liturata* (Gmelin) might be the same as *ignota*. The two species are different, however, especially the male penis valve, which, in *liturata*, lacks a dorsoapical spine.

Empria improba (Cresson)

Emphytus improbus Cresson, 1880a, p. 11.

Harpiphorus improbus: Kirby, 1882, p. 207; Dalla Torre, 1894, p. 153.

Poecilosoma improba: Konow, 1905, p. 103.

Empria improba: Ross, 1936, p. 175; Ross, 1951, p. 55.

Empria salicis Rohwer, 1910a, p. 174; Ross, 1936, p. 176 (= *improba* Cresson).

Empria contexta MacGillivray, 1911b, p. 345; Ross, 1936, p. 176 (= *improba* Cresson).

Female.—Length, 6.6 to 7.0 mm. Antenna black; head black, clypeus black, white apically, or nearly all white; labrum white. Thorax black with posterior margin of pronotum white and

tegulae partly or entirely white. Legs mostly orange with each coxa, trochanter, tarsus, and apical two-thirds of hindtibia blackish; legs sometimes all black with extreme base of hindtibia white. Abdomen black with posterior margin of each segment white and paired white spots on terga 2 to 6 or 7; apex and venter sometimes suffused with brown. Wings uniformly, lightly infuscated; veins and stigma black.

Clypeus shallowly emarginated, with median keel (pl. V, 83); genal carina extending to top of eye; postocellar area slightly less than two times broader than long; head moderately shining. Antenna long, slender, segments 6 to 8 more than twice as long as wide; length of antenna two times or more head width. Tarsal claw with long inner tooth. Forewing with first free sector of *Rs* present or absent. Hindwing with cell *M* present. Sheath rounded at apex. Each serrula of lancet long, slender, far apart, separated from ventral margin of lancet by small notch on each side, with 10 to 14 small posterior subbasal teeth (pl. VI, 94).

Male.—Length, 5.3 to 5.7 mm. Coloration and structure similar to those of female. Penis valve extended into long apical spine (pl. VII, 104, 105).

Larva.—Unknown.

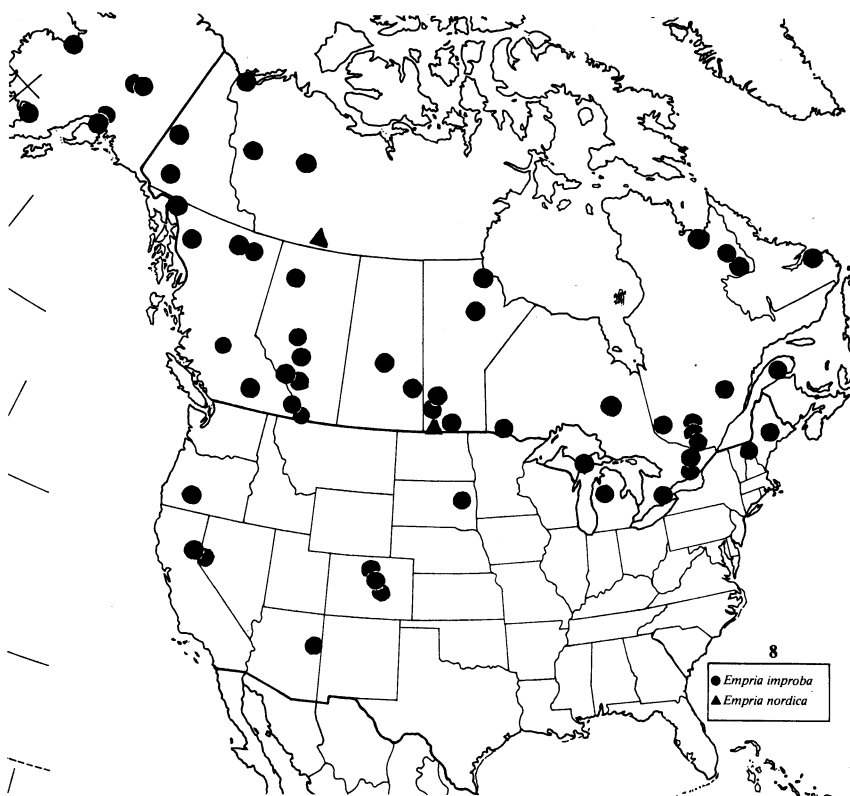
Holotypes.—*E. improbus* Cresson: At the Academy of Natural Sciences of Philadelphia, type No. 365, ♀, labeled "Nev." *E. salicis* Rohwer: At the U.S. National Museum, type No. 12838, ♀, "Florissant, Colo., S. A. Rohwer, July 7, '07," "on *Salix brachycarpa*." *E. contexta* MacGillivray: At the Illinois Natural History Survey, ♀, "Colo. 1411."

Distribution.—Transcontinental across Canada and northern United States (fig. 8): Newfoundland (Labrador), Quebec, Maine, New Hampshire, Ontario, Michigan, Northwest Territories, Manitoba, Saskatchewan, South Dakota, Colorado, Alberta, Yukon Territory, Alaska, British Columbia, Oregon, Nevada, Arizona, California.

Host.—Uncertain. Many adults have been collected from *Salix*.

Biology.—Unknown. Adults have been collected from May to July.

Discussion.—The narrow lobelike serrulae of the female lancet and the apical spine of the male penis valve will distinguish this species. The antennae are longer and more slender than in most other species of *Empria*, and the legs are more commonly reddish brown to orange than in most other species. It is very similar to the Palearctic *Empria immersa* (Klug), which feeds on *Salix*.



Empria maculata (Norton)

Emphytus maculatus Norton, 1861, p. 157; Riley, 1867, p. 348; Norton, 1867, p. 232; Walsh and Riley, 1869, p. 90; Norton, 1872, p. 80; Saunders, 1874, p. 18; Riley, 1877, p. 28; Thomas, 1878, p. 244; Hoffmeister, 1878, p. 244; Provancher, 1878, p. 69; Osborn, 1880, p. 498; Fuller, 1880, p. 109; Provancher, 1883, p. 195; Forbes, 1884, p. 68; Forbes, 1885, p. 77; Webster, 1888, p. 152; Osborn, 1893, p. 99; Webster, 1894, p. 275; Webster, 1895, p. 58; Webster, 1896, p. 33.

Harpiphorus maculatus: Provancher, 1888, p. 348; Harrington, 1890, p. 227; Dalla Torre, 1894, p. 154; Dyar, 1896, p. 236; Dyar, 1897b, p. 194; Petit, 1899, p. 365.

Poecilosoma maculata: Konow, 1905, p. 103.

Empria maculata: Webster, 1911, p. 525; Rohwer, 1912a, p. 276; Webster, 1915, p. 1; Webster, 1916 p. 291; MacGillivray, 1916, p. 55; Ross, 1936, p. 176; Neiswander, 1944, p. 35; Ross, 1951, p. 56.

Poecilostoma convexa MacGillivray, 1909, p. 402; Ross, 1936, p. 176 (= *maculata* Norton).

Empria convexa: MacGillivray, 1916, p. 55.

Empria distincta Rohwer, 1910a, p. 173; Ross, 1936, p. 176 (= *maculata* Norton).

- Empria submaculata* Rohwer, 1910a, p. 174; Ross, 1936, p. 176 (= *maculata* Norton).
- Empria melanostoma* Rohwer, 1910a, p. 175; Ross, 1936, p. 176 (= *maculata* Norton).
- Monosoma maura* Rohwer, 1910b, p. 204; Ross, 1936, p. 176 (= *maculata* Norton).
- Empria callosa* MacGillivray, 1911a, p. 305; MacGillivray, 1916, p. 55; Ross, 1936, p. 176 (= *maculata* Norton).
- Empria celsa* MacGillivray, 1911a, p. 306; MacGillivray, 1916, p. 55; Ross, 1936, p. 176 (= *maculata* Norton).
- Empria callida* MacGillivray, 1911a, p. 306; MacGillivray, 1916, p. 55; Ross, 1936, p. 176 (= *maculata* Norton).
- Empria caprina* MacGillivray, 1911a, p. 307; Ross, 1936, p. 176 (= *maculata* Norton).
- Empria casta* MacGillivray, 1911a, p. 308; MacGillivray, 1916, p. 55; Ross, 1936, p. 176 (= *maculata* Norton).
- Empria celebrata* MacGillivray, 1911a, p. 308; MacGillivray, 1916, p. 55; Ross, 1936, p. 176 (= *maculata* Norton).
- Empria captiosa* MacGillivray, 1911a, p. 308; MacGillivray, 1916, p. 55; Ross, 1936, p. 176 (= *maculata* Norton).
- Empria caeca* MacGillivray, 1911a, p. 308; MacGillivray, 1916, p. 55; Ross, 1936, p. 176 (= *maculata* Norton).
- Empria cariosa* MacGillivray, 1911a, p. 309; MacGillivray, 1916, p. 55; Ross, 1936, p. 176 (= *maculata* Norton).
- Empria candidula* MacGillivray, 1911a, p. 310; MacGillivray, 1916, p. 55; Ross, 1936, p. 176 (= *maculata* Norton).
- Empria canosa* MacGillivray, 1911a, p. 310; MacGillivray, 1916, p. 55; Ross, 1936, p. 176 (= *maculata* Norton).
- Empria cauta* MacGillivray, 1911a, p. 311; MacGillivray, 1916, p. 55; Ross, 1936, p. 176 (= *maculata* Norton).
- Empria condensa* MacGillivray, 1911b, p. 342; Ross, 1936, p. 176 (= *maculata* Norton).
- Empria cumulata* MacGillivray, 1911b, p. 343; Ross, 1936, p. 176 (= *maculata* Norton).
- Empria curata* MacGillivray, 1911b, p. 345; Ross, 1936, p. 176 (= *maculata* Norton).
- Empria cuneata* MacGillivray, 1911b, p. 345; Ross, 1936, p. 176 (= *maculata* Norton).
- Empria cupida* MacGillivray, 1911b, p. 346; Ross, 1936, p. 176 (= *maculata* Norton).
- Empria schwarzi* Rohwer, 1911a, p. 398; Ross, 1936, p. 176 (= *maculata* Norton).
- Empria cadurca* MacGillivray, 1923c, p. 158; Ross, 1936, p. 176 (= *maculata* Norton).

Female.—Length, 6.0 to 6.5 mm. Antenna and head black; clypeus, labrum, and mouthparts except each mandible white or all black, with intermediates. Thorax black with posterior margin of pronotum white; tegulae white or black. Legs usually brownish with each coxa, femur, and tarsus black, sometimes all reddish

brown or nearly all black. Abdomen black with white on posterior margin of each segment; paired white spots on terga 2 to 6, 7, or 8. Wings hyaline to lightly, uniformly infuscated.

Clypeus shallowly emarginated, with median keel; genal carina extending to top of eye; postocellar area twice as broad as long; texture of head dull, usually densely and evenly punctate. Tarsal claw with small inner tooth. Forewing with first sector of *Rs* usually absent. Cell *M* present in hindwing. Sheath long, straight above and below, nearly truncate at apex. Lancet heavily sclerotized, serrulae present on apical seven or eight segments, absent on basal three or four segments; each serrula hooklike, pointed at apex, and without subbasal teeth (pl. VI, 95).

Male.—Length, 5.1 to 5.5 mm. Variation of coloration similar to that of female. Structure similar to that of female. Penis valve broad, with short apical spine and narrow, triangular dorsal lobe (pl. VIII, 109).

Larva.—Late feeding stage, 12 to 16 mm long. Head amber with dark-brown spot on vertex and a dark-brown spot behind each eye; eyespot brownish; apex of each mandible black; sometimes a brown spot or pair of spots on frons and/or a pale brown area between frons and spot on vertex. Body pale, probably green when alive.

Hairs moderately abundant on head. Clypeus with 4 setae; labrum with 6 or 8 setae; left mandible with 2 ventral teeth, inner tooth concave, and 3 dorsal teeth with inner tooth broad and truncate, mesial ridge connecting outer dorsal tooth with inner ventral tooth; right mandible with 2 ventral teeth and 2 dorsal teeth, inner dorsal tooth broad and truncate, mesial ridge connects outer dorsal tooth with inner ventral tooth; each mandible with 1 seta on outer surface (pl. IX, 124, 125); epipharynx with arcuate row of 13 to 16 spines on each side (pl. IX, 122); labrum slightly asymmetrical; maxillary palpus 4-segmented, 1 seta on second segment, 4 setae on palpifer, 1 seta on stipes, lacinia with row of 15 to 18 spines (pl. IX, 123); labial palpus 3-segmented, second segment with 2 setae, first segment with 1 short seta; submentum with 6 to 8 setae.

Thoracic legs normal, numerous setae on segments. Ornamentation of thorax similar to that of abdomen.

Abdominal segments 1 to 9 each 6-annulate; first annulet with setae only; second annulet with setae and 2 tubercles on each side; fourth annulet as for second annulet (pl. IX, 120); subspiracular and surpedal lobes each with 5 to 10 setae; inner surface of each proleg with setae; setae numerous on suranal and subanal areas.

Holotypes.—Norton's type of *maculatus* is at the Museum of Comparative Zoology, Harvard University, ♀, labeled "Type 14009," "Emphytus maculatus Norton, Ct."

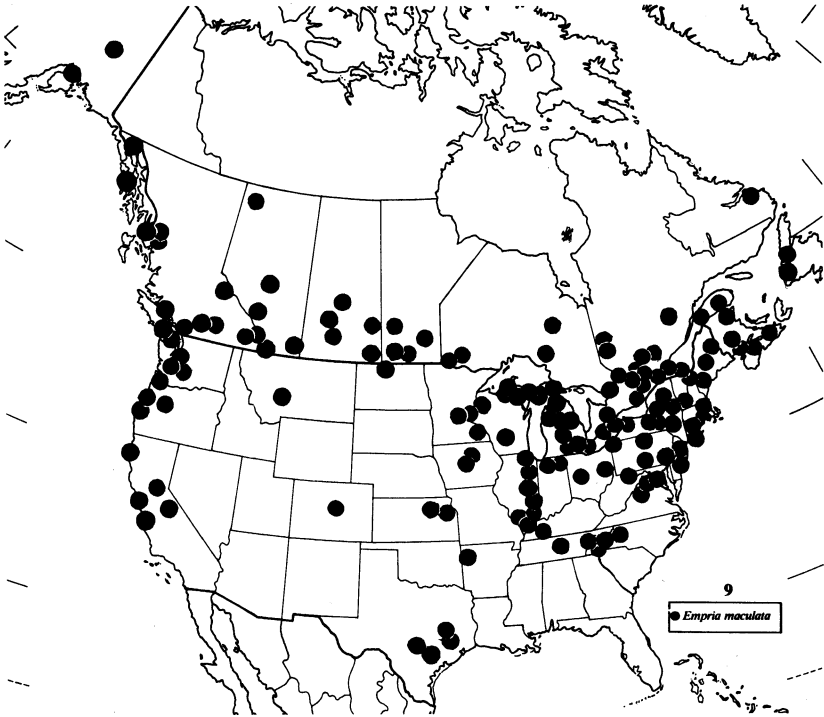
MacGillivray's types are at the Illinois Natural History Survey: *P. convexa*, ♀, "N. Brunsw., N.J."; *E. callosa*, ♀, "Slaterville-Caroline, N.Y., 14 June '04"; *E. celsa*, ♀, "Ithaca, N.Y., 10 May '96"; *E. callida*, ♀, "Ithaca, N.Y., 9 June '06"; *E. caprina*, ♀, "Ithaca, N.Y., 22 May '98"; *E. casta*, ♀, "Salineville, Ohio"; *E. celebrata*, ♀, "Buffalo, N.Y., 6-5-97, E. P. V. Coll."; *E. captiosa*, ♀, "Ames, Ia., 5-6"; *E. caeca*, ♀, "Ithaca, N.Y."; *E. cariosa*, ♀, "Slaterville-Caroline, N.Y., 14 June '04"; *E. candidula*, ♀, Ithaca, N.Y., 25 May '95"; *E. canosa*, ♀, "Sherborn, Mass., May 30, '95"; *E. cauta*, ♀, "Ithaca, N.Y., 17 June '97"; *E. condensa*, ♀, "Polk Co., Wisc., July, Baker," "6498"; *E. cumulata*, ♀, "5-23-92," "Olympia, Wash.," "T. Kincaid, collector"; *E. curata*, ♀, "6-17-94," "Olympia, Wash.," "T. Kincaid, collector"; *E. cuneata*, ♀, "5-21-92," "Olympia, Wash.," "T. Kincaid, collector"; *E. cupida*, ♀, "6-13-94," "Olympia, Wash.," "T. Kincaid, collector"; *E. cadurca*, ♀, "Edmonton, Alta., June 2, 1917, F. S. Carr."

Rohwer's types are at the U.S. National Museum: *E. distincta*, type No. 12833, ♀, "Va.," "through C. V. Riley," "No. 7 saw"; *E. submaculata*, type No. 12826, ♀, "Cana. 2051," "Collection C. F. Baker"; *E. melanostoma*, type No. 12839, ♀, "Sitka, Alaska, June 16, '99," "Harriman Expedition '99, T. Kincaid, collector"; *M. maura*, type No. 12927, ♀, "Nerepis, N.B., 18 June," "A. G. Leavitt, collector."

Distribution.—Widespread in the United States and Canada (fig. 9): Newfoundland (Labrador and insular), Nova Scotia, New Brunswick, Quebec, Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, Ontario, New York, New Jersey, Pennsylvania, Maryland, District of Columbia, Virginia, North Carolina, Kentucky, Tennessee, Michigan, Ohio, Indiana, Wisconsin, Illinois, Manitoba, Minnesota, Iowa, Arkansas, North Dakota, Kansas, Texas, Saskatchewan, Montana, Colorado, Alberta, Alaska, British Columbia, Washington, Oregon, California.

Hosts.—*Fragaria* sp., *Potentilla* sp., *Rubus* sp., and probably other Rosaceae.

Biology.—Numerous notes appeared in the early literature on this species, but the best biological study is that of Webster (1915) in Iowa. Webster termed *maculata* the "late strawberry slug" because of its appearance at about the time the strawberry fruits are ripe as opposed to *E. obscurata*, the "early strawberry slug," which appears at about the time the host is in blossom. Earlier



authors termed *maculata* the "strawberry worm" or the "strawberry saw-fly."

Adults emerge from late April to June in Iowa. Eggs are deposited in the stems of the strawberry leaves. After the larvae hatch, they feed on the lower surfaces of the leaves. Mature larvae enter the soil where they form a cell, overwinter, and pupate. There is one generation a year. Those reared from *Rubus* and *Potentilla*, associated with Hopkins' Nos. 10783⁸² and 10783¹, respectively, have a similar life history according to the associated notes.

Webster (1916) discussed discrepancies in the number of generations a year as reported by some previous authors and stated that there may be a third species attacking strawberry (other than *E. maculata* and *E. obscurata*). For instance, Riley (1867) thought there were two generations a year, and F. Webster (1888) and Petit (1899) found larvae abundant in the fall. Another species, *Taxonus pallicoxus* (Provancher), also feeds on strawberry. The color of the *pallicoxus* larvae resembles that of *maculata*, but it is

bivoltine, and I believe that this has been confused with *Empria* species on *Fragaria* in the past.

Discussion.—Examination of the genitalia of both sexes will serve to separate this distinct species from other species of *Empria*. The color pattern of the head of the larva and lack of brown markings on the body will separate the larva. Larvae of *Taxonus* species that feed on *Fragaria* lack setae on the first annulet of each abdominal segment and may be distinguished in this manner.

Empria mexicana (Cameron), new combination

Poecilosoma mexicanum Cameron, 1883, p. 34; Dalla Torre, 1894, p. 128; Konow, 1905, p. 104.

Empria arizonensis Rohwer, 1910a, p. 174; Ross, 1936, p. 174 (= *obscurata* Cresson). New synonymy.

Female.—Length, 6.6 to 6.9 mm. Antenna and head black; labrum whitish. Thorax black with posterior margin of pronotum and tegulae white. Legs black with extreme apex of forefemur, outer surface of foretibia, and basal quarter of midtibia and hindtibia white. Abdomen black, narrow white band sometimes present on posterior margin of each segment; paired white spots on terga 2 to 5 or 6, these sometimes brownish and not evident. Wings darkly, uniformly infuscated; veins and stigma black.

Clypeus shallowly emarginated, with median keel; genal carina extending to top of eye; postocellar area twice as broad as long; head shining. Antenna stocky, about twice head width; seventh and eighth segments each only twice as long as broad. Tarsal claw with small inner tooth. First free sector of vein *Rs* of forewing present. Cell *M* of hindwing present. Sheath straight above, rounded below and at apex. Each serrula of lancet low, rounded at apex, with large anterior subbasal tooth appearing as a step to ventral margin of lancet, and five or six fine posterior subbasal teeth; segments of lancet separated by rows of fine hairs (pl. VII, 96).

Male.—Length, 6.0 to 6.3 mm. Coloration similar to that of female except labrum and tegulae, which are usually brownish or black. Structure similar to that of female. Penis valve broad, with short dorsoapical spine and large ventroapical lobe, triangular to oblong (pl. VIII, 108).

Larva.—Unknown.

Holotypes.—*P. mexicana* Cameron: At the British Museum (Natural History), London, type No. 1.361, ♀, labeled "Milpas, Mex., 5,900 ft., Forrer." *E. arizonensis* Rohwer: At the U.S. National Museum, type No. 12837, ♀, labeled "Ariz."

Distribution.—Southwestern United States and northern Mexico (fig. 7): New Mexico, Arizona, Durango.

Host.—Unknown.

Biology.—Unknown.

Discussion.—This species is similar to *obscurata* and has been confused with that species through the former synonymy of Rohwer's *arizonensis*. The females of *mexicana* are separated from *obscurata* by the lancet, which has a large steplike anterior sub-basal tooth to each serrula. The males of the two species are almost too close to distinguish adequately, although the penis valve of *mexicana* is somewhat more slender than that of *obscurata*. In general habitus, this insect is more shining and has more darkly infuscated wings than does *obscurata*.

Empria multicolor (Norton)

Strongylogaster multicolor Norton, 1862a, p. 120.

Taxonus multicolor: Norton, 1868, p. 212; Provancher, 1878, p. 165; Provancher, 1883, p. 214; Dalla Torre, 1894, p. 112; Dyar, 1895b, p. 338; Dyar, 1895c, p. 309.

Poecilosoma multicolor: Konow, 1905, p. 104.

Parataxonius multicolor: MacGillivray, 1908, p. 367; MacGillivray, 1916, p. 57.

Empria multicolor: Ross, 1936, p. 177; Ross, 1951, p. 56; Wong, 1954, p. 154; Maxwell, 1955, p. 78.

Emphytus hullensis Provancher, 1885, p. 25; Dalla Torre, 1894, p. 118; Konow, 1905, p. 106; Gahan and Rohwer, 1917, p. 397; Ross, 1936, p. 177 (= *multicolor* Norton); Smith, 1975b, p. 298.

Eriocampa superba Provancher, 1885, p. 351; Dalla Torre, 1894, p. 118; Konow, 1905, p. 101; Gahan and Rohwer, 1917, p. 398; Ross, 1936, p. 177 (= *multicolor* Norton); Smith, 1975b, p. 301.

Empria carbasea MacGillivray, 1911b, p. 341; Ross, 1936, p. 177 (= *multicolor* Norton).

Aphilodyctium maculatum Rohwer, 1911a, p. 408; Ross, 1936, p. 177 (= *multicolor* Norton). Preoccupied in *Empria* by *maculata* Norton.

Aphilodyctium multicolor erythogastrum Rohwer, 1911a, p. 408; Ross, 1936, p. 177 (= *multicolor* Norton).

Female.—Length, 5.5 to 6.0 mm. Antenna black; head black with inner and upper orbits, malar space, supraclypeal area, clypeus, and mouthparts yellow; hind orbits all yellow or partly black. Thorax black with posterior margin of pronotum, tegulae, stripe on mesepisternum, and a small spot on each side of mesonotum yellow. Legs entirely yellow orange; each coxa mostly white. Abdomen usually orange, varying to dark brown, especially on dorsum; basal plates and sheath black; paired white spots on terga 2 to 7 or 8. Wings hyaline.

Clypeus emarginated for about one-third its medial length, flat,

without median keel (pl. V, 86); postocellar area as long as broad; genal carina extending to top of eye; head shining. Tarsal claw with long inner tooth and inconspicuous basal lobe. First free sector of vein *Rs* of forewing usually present. Cell *M* of hindwing absent. Sheath straight above, slightly rounded below and at apex. Serrulae of lancet low, flat, with 1 or 2 anterior and 7 to 10 posterior subbasal teeth (pl. VII, 98).

Male.—Length, 5.2 to 5.6 mm. Coloration and structure similar to those of female. Penis valve slender, with small dorsoventral spine and long, narrow dorsal lobe (pl. VIII, 112, 113).

Larva.—Similar to the larva of *maculata* with the following differences: Dark-brown spot behind each eye connected to black eyespot; broad, dark-brown supraspiracular longitudinal stripe on each side of body and sometimes a broken subspiracular line; apical third of 10th tergum dark brown (pl. IX, 119); right mandible with three ventral teeth, inner tooth concave, middle tooth small, and one mesial tooth.

Holotypes.—*S. multicolor* Norton: Not located. *E. hullensis* Provancher: In the Canadian National Collection, Ottawa, ♀, labeled "TYPE *E. hullensis* No. 1265," "TYPE *E. hullensis* Prov. ♀ 344," "Lectotype *Emphytus hullensis* Provancher, Comeau Apr. 1940" (Smith, 1975b). *E. superba* Provancher: Laval University, Ste. Foy, Quebec, ♀, with yellow label "1544" (Smith, 1975b). *E. carbasea* MacGillivray: At the Illinois Natural History Survey, ♀, "4-15-96," "6," "T. Kincaid collector." Rohwer's types are at the U.S. National Museum: *A. maculatum*, type No. 12813, ♀, "Nev.;" *A. multicolor erythrogastrum*, type No. 12814, ♀, "Westville, N.J., 6-6-97 [?]," "collection W. H. Ashmead."

Distribution.—Widespread in North America (fig. 6): Nova Scotia, New Brunswick, Quebec, Maine, New Hampshire, Vermont, Massachusetts, Ontario, New York, Pennsylvania, New Jersey, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, Tennessee, Georgia, Michigan, Ohio, Wisconsin, Saskatchewan, Alberta, British Columbia, Washington, Oregon, Nevada, California.

Hosts.—*Betula* sp., *Alnus* sp. Species of birch include *B. papyrifera* Marsh. (Wong, 1954; Dyar, 1895b) and *B. lenta* L. (Dyar, 1895b).

Biology.—Dyar (1895b), Wong (1954), and Hopkins' cards associated with No. 10783^a (specimens reared from *Alnus* at Falls Church, Va.) all indicate a similar life cycle for this species. Adults appear in the spring and larvae feed in late spring and early summer, usually on the undersurface of the leaves. They

overwinter in dirt cells in the ground. There is one generation a year.

Discussion.—This is a very distinct species, characterized by the flat, emarginated clypeus, long inner tooth of the tarsal claws, absence of cell *M* in the hindwing, and yellow markings on the head and mesopleuron. The abdomen varies from dark brown to nearly orange; in the specimens with the orange abdomen, the paired white spots are sometimes not obvious. The only other North American species with such extensive pale markings is *candidata*; however, *candidata* usually has the pale markings white, not yellowish, at most a minute inner tooth on the tarsal claw, a more shallowly emarginated clypeus, and a broader post-ocellar area.

Empria nordica Ross

Empria nordica Ross, 1936, p. 175; Ross, 1951, p. 56.

Female.—Length, 5.5 mm. Antenna and head black; labrum whitish. Thorax black with posterior margin of pronotum and tegulae white. Legs black with extreme apex of each femur, all of foretibia and midtibia except extreme apices, and extreme base of hindtibia white. Abdomen black with narrow white band on posterior margin of each segment; paired white spots on terga 2 to 6. Wings uniformly lightly infuscated; veins and stigma black.

Clypeus shallowly emarginated, with median keel; texture of head dull. Tarsal claw with small inner tooth. First free sector of vein *Rs* of forewing present. Cell *M* of hindwing present. Sheath long, tapering to narrow, rounded apex. Segments of lancet bare, hairs absent; serrulae low, flat, each with 2 or 3 anterior and 10 to 12 posterior subbasal teeth (pl. VII, 97); in general, lancet long and narrow.

Male.—Unknown.

Larva.—Unknown.

Holotype.—At the Illinois Natural History Survey, ♀, labeled "Aweme, Man., VI-1-12, N. Criddle," "S 142."

Distribution.—Central Canada (fig. 8): MANITOBA: Aweme, VI-1-12; 2 mi W. Stockton, 22-V-1958, ex *Rosa arkansana*. NORTHWEST TERRITORIES: Hay River, May 16, 1927.

Host.—Unknown, except for adult collection records.

Biology.—Unknown.

Discussion.—This is not a common species, but the lancet is quite distinct in lacking hairs between the segments, having low, flat serrulae, and being rather long and slender.

Empria obscurata (Cresson)

- Selandria obscurata* Cresson, 1880a, p. 15.
Monostegia obscurata: Kirby, 1882, p. 186.
Eriocampa obscurata: Dalla Torre, 1894, p. 131.
Poecilosoma obscurata: Konow, 1905, p. 104.
Empria obscurata: Ross, 1936, p. 174; Ross, 1951, p. 76.
Emphytus maculatus: Riley, 1868, p. 121; Forbes, 1884, p. 121.
Monostegia ignota: Malley, 1889, p. 138; Malley, 1890, p. 9; Osborn and Gosard, 1892, p. 512; Osborn, 1893, p. 98; Webster, 1911, p. 525; Webster, 1912, p. 471.
Harpiphorus maculatus: Stedman, 1901, p. 54.
Poecilosoma punctulata Weldon, 1907, p. 304; Ross, 1936, p. 174 (= *obscurata* Cresson).
Empria affinis Rohwer, 1910a, p. 173; Ross, 1936, p. 174 (= *obscurata* Cresson).
Empria caudelli Rohwer, 1910a, p. 173; Ross, 1936, p. 174 (= *obscurata* Cresson).
Empria cava MacGillivray, 1911a, p. 306; Ross, 1936, p. 174 (= *obscurata* Cresson).
Empria cauduca MacGillivray, 1911a, p. 309; MacGillivray, 1916, p. 55; Ross, 1936, p. 174 (= *obscurata* Cresson).
Empria capillata MacGillivray, 1911b, p. 341; Ross, 1936, p. 174 (= *obscurata* Cresson).
Empria condita MacGillivray, 1911b, p. 342; Ross, 1936, p. 174 (= *obscurata* Cresson).
Empria contorta MacGillivray, 1911b, p. 343; Ross, 1936, p. 174 (= *obscurata* Cresson).
Empria conferta MacGillivray, 1911b, p. 344; Ross, 1936, p. 174 (= *obscurata* Cresson).
Empria concreta MacGillivray, 1911b, p. 344; Ross, 1936, p. 174 (= *obscurata* Cresson).
Empria conciliata MacGillivray, 1911b, p. 344; Ross, 1936, p. 174 (= *obscurata* Cresson).
Empria concisa MacGillivray, 1911b, p. 346; Ross, 1936, p. 174 (= *obscurata* Cresson).
Empria costata MacGillivray, 1914a, p. 103; MacGillivray, 1916, p. 55; Ross, 1936, p. 174 (= *obscurata* Cresson).
Empria fragariae Rohwer, 1914, p. 479; Webster, 1915, p. 1; Webster, 1916, p. 291; Ross, 1936, p. 174 (= *obscurata* Cresson).
Empria cista MacGillivray, 1923d, p. 16; Ross, 1936, p. 174 (= *obscurata* Cresson).
Empria cistula MacGillivray, 1923d, p. 16; Ross, 1936, p. 174 (= *obscurata* Cresson).

Female.—Length, 5.6 to 6.1 mm. Antenna and head black; labrum whitish. Thorax black with posterior margin of pronotum white; tegulae black or white. Legs mostly whitish to reddish brown with each coxa, base of each femur, and each tarsus black; legs sometimes completely black. Abdomen black with narrow

white band on posterior margin of each segment; paired white spots on terga 2 to 6 or 7. Wings lightly, uniformly infuscated.

Clypeus shallowly emarginated, with median keel (pl. V, 84); genal carina extending to top of eye; postocellar area twice as broad as long; head moderately shining. Tarsal claw with small inner tooth. First free sector of vein *Rs* of forewing present. Cell *M* of hindwing present. Sheath straight above, rounded below and at apex. Serrulae of lancet each low, rounded at apex, with one anterior and five or six posterior subbasal teeth; segments of lancet separated by rows of fine hairs (pl. VII, 99).

Male.—Length, 5.2 to 5.7 mm. Coloration and structure similar to those of female. Penis valve broad, triangular, with rounded ventroapical lobe, small dorsoapical spine, and large, rounded dorsal lobe (pl. VIII, 106, 107).

Larva.—Similar to the larva of *Empria maculata* with the following differences: Head entirely amber, only eyespot and apex of each mandible black or red brown.

Holotypes.—The type of *S. obscurata* Cresson is at the Academy of Natural Sciences of Philadelphia, type No. 200, ♀, labeled "Colo." MacGillivray's types are at the Illinois Natural History Survey: *E. cava*, ♀, "Lancaster, N.Y., 5-31-08, M. C. V. coll."; *E. cauduca*, ♀, "Ithaca, N.Y., 5 May '95"; *E. capillata*, ♀, "Peck, Ida."; *E. condita*, ♀, "Colo."; *E. contorta*, ♀, "Chimney Gulch, Colo., 4-23-99, Oslar," "Cornell U., Lot 223, Sub."; *E. conferta*, ♀, "Colo. 1333"; *E. concreta*, ♀, "Colo."; *E. conciliata*, ♀, "Chimney Gulch, Oslar, Colo., 4-2-99"; *E. concisa*, ♀, "Pullman, Wash.," "Collector, C. V. Piper"; *E. costata*, ♀, "New Haven, Ct., 11 May 1911, B. H. Walden"; *E. cista*, ♀, "Campus, 4/8," "Peterson 89"; *E. cistula*, ♀, "Marys River, Apr. 20," "Glines, collector."

P. punctulata Weldon is U.S. National Museum, type No. 27723, only the thorax and wings remain with the labels "Colo. 2204," "McG.," "12," "Det. MacG." Rohwer's types are in the U.S. National Museum: *E. affinis*, type No. 12834, ♀, "Colo. 1041," "Collection C. F. Baker"; *E. caudelli*, type No. 12835, ♀, "Saw No. 1 mounted," "Dyar and Caudell," "Chenney Glh., Col. 5-13-01"; *E. fragariae*, type No. 18357, ♀, "Exp. 113 (1911) 7 Apr. 1912," "Ames, Ia., R. L. Webster."

Distribution.—Widespread in North America (fig. 7): Newfoundland (Labrador), New Brunswick, Quebec, Maine, New Hampshire, Massachusetts, Connecticut, Ontario, New York, Pennsylvania, New Jersey, Michigan, Indiana, Illinois, Manitoba, Iowa, South Dakota, Kansas, Saskatchewan, Montana, Colorado, Northwest Territories, Alberta, Alaska, British Columbia, Idaho, Washington, Oregon, California.

Hosts.—*Fragaria* sp., *Rosa* sp. (wild rose).

Biology.—Scattered notes on the biology of this species occur in the early literature under various names. Webster (1915) published on the biology of *obscurata* using the name *Empria fragariae* Rohwer. Webster called this species the "early strawberry slug" because most of the injury occurs before the fruit of the host ripens and because larvae of this species are found earlier than those of *maculata*.

Adults emerge in April in Iowa, and eggs are inserted in the leaf tissue just below the lower epidermis and commonly along the side veins or between the veins. The larvae feed on the upper surface, and, when mature, enter the ground to make earthen cells where they overwinter.

The following data from Webster (1916) summarize the differences between the two species of *Empria* known to feed on strawberry in Iowa.

	<i>E. obscurata</i>	<i>E. maculata</i>
Generations -----	One -----	One.
Adults appear -----	Early April -----	Late April.
Eggs deposited -----	In leaves -----	In stems.
Larvae appear -----	May (during blossoming) -----	June (as fruit ripens).
Larvae begin feeding --	On upper epidermis --	On lower epidermis.
Larval head width (stage I) -----	0.51 mm -----	0.32 mm.
Larval head markings --	None -----	Dark-brown markings above and at sides.

Discussion.—The genitalia as illustrated (pl. VII, 99; pl. VIII, 106, 107) will distinguish this species. Note especially the low serrulae of the lancet, presence of hairs separating the segments of the lancet, and the ventroapical lobe of the penis valve.

The larva of *obscurata* may be distinguished by its unicolorous head and body.

Genus PHRONTOSOMA MacGillivray

Phrontosoma MacGillivray, 1908, p. 366; MacGillivray, 1916, p. 47; Ross, 1937b, p. 93; Ross, 1951, p. 60.

Type-species: *Phrontosoma atrum* MacGillivray. Original designation.

Adult.—Antenna stout, second segment slightly longer than broad, third segment longer than fourth segment and subequal in length to fourth plus fifth segments (pl. IX, 126). Genal carina short, extending only one-third length of eye; clypeus very shallowly emarginated (pl. IX, 128); malar space less than diameter

of front ocellus; each mandible bidentate. Mesopleurae and mesonotum without large punctures. Propleurae acute on meson. Tarsal claw with long inner tooth and inconspicuous basal lobe (pl. IX, 127). Forewing with anal crossvein oblique; first free sector of vein *Rs* present, veins *M* and *Rs* + *M* meeting *Sc* + *R* at same point. Hindwing with cell *Rs* absent, cell *M* present; anal cell petiolate with petiole slightly longer than cell width. Male without peripheral vein in hindwing.

Larva.—Unknown.

Discussion.—The acute propleurae, bidentate mandibles, shallowly emarginated clypeus, and short genal carina are characters that, when used together, will distinguish members of *Phrontosoma*. The species are very stout insects as opposed to the more elongate form of other Allantinae and may be mistaken for members of the Blennocampinae unless the wing venation is examined.

Because of its uncertain position, Ross (1937b) put *Phrontosoma* in a separate tribe, the Phrontosomatini, separated by the narrow malar space and the low parapenis of the male genitalia. Though these characters help for generic separation, they are not adequate for delimiting a separate tribe. *Phrontosoma* belongs in the Empriini as defined in the introduction.

This is an exclusively North American genus, and only one species had previously been included. I have separated three species, primarily on the basis of the female sheath and lancet. The host is known only for *usta*, which feeds on *Cornus*.

Key to *Phrontosoma* Species

Adults

- | | |
|---|---|
| 1. Female | 2 |
| Male | 4 |
| 2. Serrulae of lancet deep, lobelike, rounded at apices (pl. X, 135) | |
| <i>P. brocca</i> , n. sp. | |
| Serrulae of lancet shallow, flat (pl. X, 134, 136) | 3 |
| 3. Serrulae of lancet each without anterior subbasal teeth (pl. X, 134); thorax entirely black or with only mesonotum (except scutellum) and pronotum red | |
| <i>P. belfragei</i> (Cresson) | |
| Serrulae of lancet each with two anterior subbasal teeth (pl. X, 136); pronotum, mesopleuron, and mesonotum red | |
| <i>P. usta</i> , n. sp. | |
| 4. Harpe oval, about as broad as long, with angular inner margin (pl. X, 139) | |
| <i>P. belfragei</i> (Cresson) | |
| Harpe more elongate, longer than broad, with straight inner margin (pl. X, 137) | |
| <i>P. usta</i> , n. sp. | |

Descriptions of *Phrontosoma* Species

Phrontosoma belfragei (Cresson)

Selandria belfragei Cresson, 1880a, p. 15.

Monostegia belfragei: Kirby, 1882, p. 186.

Eriocampa belfragei: Dalla Torre, 1894, p. 130.

Poecilosoma belfragei: Konow, 1905, p. 103.

Phrontosoma belfragei: Ross, 1937b, p. 94; Ross, 1951, p. 61.

Caliroa nortonia MacGillivray, 1894, p. 324; Ross, 1937b, p. 94 (= *belfragei* Cresson).

Eriocampoides nortonia: Konow, 1905, p. 74.

Phrontosoma nortonia: MacGillivray, 1908, p. 367; MacGillivray, 1916, p. 48.

Phrontosoma atrum MacGillivray, 1908, p. 367; MacGillivray, 1916, p. 48; Ross, 1937b, p. 94 (= *belfragei* Cresson).

Phrontosoma daeckei MacGillivray, 1908, p. 367; MacGillivray, 1916, p. 48; Ross, 1937b, p. 94 (= *belfragei* Cresson).

Phrontosoma collaris MacGillivray, 1908, p. 367; MacGillivray, 1916, p. 48; Ross, 1937b, p. 94 (= *belfragei* Cresson).

Female.—Length, 6.5 to 6.8 mm. Antenna and head black; labrum brownish. Thorax black with posterior margin of pronotum and tegulae white, or black with pronotum, tegulae, and mesonotum except scutellum rufous. Legs with each coxa black, each trochanter whitish, forefemur and midfemur infuscated or yellowish, hindfemur mostly black but sometimes yellowish, apex of each femur and all of each tibia and tarsus whitish; each tarsus infuscated toward apex. Abdomen black. Wings hyaline to very lightly uniformly infuscated; veins and stigma black.

Antenna somewhat more slender than that of *usta*, with fourth and fifth segments about twice as long as broad. Outer, upper, and inner orbits slightly shagreened and more punctate than in *usta*. Sheath long, broadly rounded at apex, from above thin at apex (pl. IX, 129, 130). Lancet with about 24 serrulae; each serrula low, very slightly rounded, with no anterior and 10 to 15 fine posterior subbasal teeth; hairs on lower half of lancet long, uniformly covering width of each segment (pl. X, 134).

Male.—Length, 5.4 to 5.8 mm. Coloration similar to that of female except thorax, which is always black with tegulae and posterior margin of pronotum white. Structure similar to that of female. Parapenis of genitalia low, round without narrow apical lobe; harpe oval, about as broad as long, angled on inner margin; penis valve rounded (pl. X, 139, 140).

Larva.—Unknown.

Types.—The type of *S. belfragei* Cresson is at the Academy of Natural Sciences of Philadelphia, ♀, labeled "Tex." "1118" [or 8111 ?], "type No. 185." MacGillivray's types are at the Illinois Natural History Survey: *C. nortonia*, ♂, "Millersville, N.Y., 30

May '90"; *P. atrum*, ♂, "Exp. Sta., 5-2-97, Ames, Ia."; *P. daeckei*, ♂, "Glenside, Mtg. Co., Pa., V-30-1904," "F. Daecke, Collector"; *P. collaris*, ♀, "Exp. Sta., 5-11-97, Ames, Ia."

Distribution.—Eastern North America, west to Alberta and Kansas (fig. 10): Quebec, Massachusetts, Ontario, New York, New Jersey, Pennsylvania, Michigan, Ohio, Wisconsin, Illinois, Manitoba, Iowa, Missouri, Kansas, Texas, Alberta.

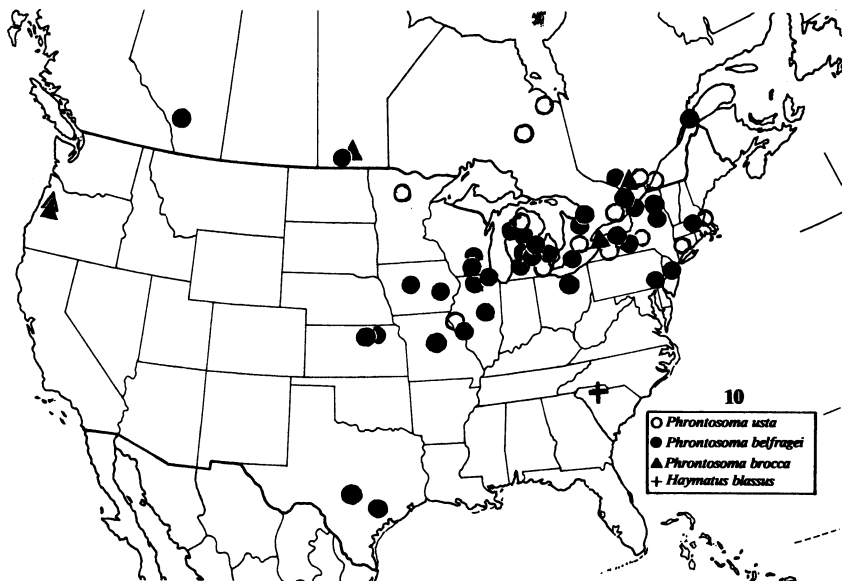
Host.—Unknown. One adult was taken from *Cornus* sp. in Kansas.

Biology.—Unknown. All collection dates are from late April to the middle of June.

Discussion.—The low flat serrulae of the lancet, which lack anterior subbasal teeth, will distinguish females of this species. Also, the mesopleuron is black in *belfragei* but more commonly rufous in *usta*. The antennae are not quite as stout and the punctures on the outer orbits are more dense in *belfragei*, but these are difficult to describe unless specimens of each species can be compared. The males of *belfragei* and *usta* are most easily separated by comparing the figures of the genitalia (pl. X, 137-140).

Phrontosoma brocca, new species

Female.—Length, 7.0 mm. Antenna and head black; labrum whitish. Thorax black with pronotum, tegulae, and mesonotum except scutellum rufous. Legs with each coxa, trochanter, and



femur black, joints usually whitish, rest of legs white with each tarsus infuscated toward apex. Abdomen and sheath black. Wings very lightly, uniformly infuscated; veins and stigma black.

Clypeus slightly emarginated at center. Fourth and fifth antennal segments each about twice as long as broad. Head shining, without punctures. Sheath straight above, rounded below and at apex, slightly thickened at apex in dorsal view (pl. IX, 133). Lancet with 14 serrulae, each serrula deep, lobelike, rounded at apex, and with 2 or 3 anterior and 2 or 3 posterior subbasal teeth near base (pl. X, 135).

Male.—Unknown.

Larva.—Unknown.

Holotype.—Female, Helmick State Park, 15 mi N. Corvallis, Oreg., Polk Co., IV-18-1957. U.S. National Museum type No. 73410.

Paratypes.—NEW YORK: Niagara Falls, 5-25-19, M. C. VanDuzee (1 ♀). MANITOBA: Aweme, 1-VI-1915, N. Criddle (1 ♀). OREGON: Corvallis, 15 May, 1957, E. R. Turner (1 ♀). At the Illinois Natural History Survey, Canadian National Collection, and Florida State Collection of Arthropods.

Other Specimens.—Quebec: Hull, 17-5-03 (1 ♀).

Distribution.—Quebec, New York, Manitoba, Oregon (fig. 10).

Host.—Unknown.

Biology.—Unknown.

Discussion.—The long lobelike serrulae of the lancet, the straight upper margin of the sheath in lateral view, and the expanded apical portion of the sheath in dorsal view will separate *brocca* from other species of this genus.

The name is an arbitrary combination of letters and is to be used as a noun.

Phrontosoma usta, new species

Female.—Length, 6.7 to 7.0 mm. Antenna and head black, labrum white. Thorax rufous with cervical sclerites, pectus, mesoscutellum, mesepimeron, and metathorax black; tegulae white. Legs with each coxa black, each trochanter and femur yellow orange, each tibia and tarsus white; each tarsus infuscated toward apex. Abdomen black. Wings hyaline to very lightly, uniformly infuscated; veins and stigma black.

Antenna stout, fourth and fifth segments each less than two times longer than broad. Outer, upper, and inner orbits smooth and shining, with few scattered punctures. Sheath long, broadly rounded at apex, from above thickened at apex nearly forming a

slight scopa (pl. IX, 131, 132). Lancet with 24 serrulae, each serrula low, flat, with 2 anterior and 7 or 8 posterior subbasal teeth; hairs on lower half of lancet short, not exceeding width of segment (pl. X, 136).

Male.—Length, 5.8 to 6.1 mm. Coloration similar to that of female except thorax, which is black with upper half of pronotum brownish and tegulae white. Structure similar to that of female. Parapenis of genitalia with narrow apical lobe; harpe elongate, longer than broad, straight on inner margin; penis valve round but flattened at apex (pl. X, 137, 138).

Larva.—Unknown.

Holotype.—Female, Melrose Hlds., Mass., *Cornus* sp., Gip. Moth Lab. 12164J51, bred specimen, 5–15–24. U.S. National Museum type No. 73411.

Paratypes.—QUEBEC: Chatauguay, July 1, '99 (1 ♀); Beechgrove, 45° 39', 76° 8', 17–4–1961, J. R. Vockeroth (2 ♀♀); Hull, 16–5–01 (1 ♀). MASSACHUSETTS: Same data as for holotype except dates, 5–13–24 (1 ♀), 5–16–24 (1 ♂). CONNECTICUT: Branford, 2–V–1951, James B. Kring (1 ♀). ONTARIO: Smoky Falls, Mattagami R., 11–VI–1934, G. S. Walley (1 ♀); Simcoe, 5–VI–1939, G. E. Shewell (1 ♀); Moose Factory, 8–VI–1949, D. F. Hardwick (1 ♀). NEW YORK: Batavia, June 1, 1914, H. H. Knight (1 ♀); Ithaca, 26 Apr. '15 (1 ♂), 25 Apr. '15 (1 ♂). MICHIGAN: Washtenaw Co., Sylvan Rd., V–24–1919, R. F. Hussey (1 ♀); Charlevoix Co., Hog Isl., May 27, 1921, 348, S. Moore (1 ♀). ILLINOIS: Camp Point, Adams Co., April 29, 1960, Ross and Cunningham (2 ♀♀). At the U.S. National Museum, Illinois Natural History Survey, Michigan State University, and Canadian National Collection.

Other Specimens.—ONTARIO: Kinburn, 14–V–1968 (1 ♀); Marmora, May 26, 1952, on bracken (1 ♀), 19–V–1952 (1 ♀), 7–V–1952 (1 ♀), 18–V–1952 (1 ♀), May 20, 1952 (1 ♀); Spencerville, Limerick Forest, 12–V–1955 (1 ♀). MINNESOTA: Bena, 21–V–1960, spruce swamp (1 ♀).

Distribution.—Quebec to New York, west to Minnesota (fig. 10).

Host.—*Cornus* sp.

Biology.—Three specimens bear the labels “bred specimens, *Cornus*,” but I could find no information associated with the rearings.

Discussion.—The flat serrulae will distinguish this species from *brocca*, and the anterior subbasal teeth of the serrulae will distinguish this species from *belfragei*. The reddish mesopleuron and whitish hindfemora will distinguish *usta* in some specimens, but

genitalia should be examined for accurate determination. The best way to distinguish males is by comparing plate X, 137–140.

The name is an arbitrary combination of letters and is to be treated as a noun.

Genus **HAYMATUS**, new genus

Type-species: *Haymatius blassus*, new species.

Adult.—Antenna long, slender, more than twice width of head; second segment broader than long; third and fourth segments subequal in length; segments beyond fourth gradually decreasing in length (pl. X, 143). Genal carina absent; clypeus truncate; malar space less than half diameter of front ocellus; each mandible bidentate with inner tooth short (pl. X, 141). Mesopleuron and mesonotum without large punctures. Propleurae acute on meson. Tarsal claw with long inner tooth, basal lobe absent (pl. X, 142). Anal crossvein of forewing oblique; first free sector of vein *Rs* present; veins *M* and *Rs* + *M* meet *Sc* + *R* at same point. Hindwing with cell *Rs* absent, cell *M* present; anal cell petiolate, petiole shorter than cell width. Abdomen black, without paired white spots. Male without peripheral vein in hindwing.

Larva.—Unknown.

Discussion.—This genus is described for several unusual specimens representing a new species. It appears close to *Phrontosoma* and *Monosoma* but differs by the long antennae with the subequal third and fourth segments, truncate clypeus, narrow malar space, and short petiole of the anal cell of the hindwing. Superficially the genus resembles *Empria*, but *Haymatius* lacks paired white spots on the abdomen, lacks a genal carina, and other characters as stated do not agree.

The name is an arbitrary combination of letters; gender, masculine.

Description of *Haymatius* Species

Haymatius blassus, new species

Female.—Unknown.

Male.—Length, 5.8 mm. Black, only apex of forefemur and outer surface of foretibia brownish to white. Wings darkly, uniformly infuscated; veins and stigma black.

Body smooth and moderately shining, without punctures, and covered with white pubescence. Genitalia with harpe oval, longer than broad; parapenis broad, long, truncated at apex; penis valve

slanted ventrally, dorsoapical margin flat, without spines, with longitudinal ridge extending length of head of valve (pl. X, 144, 145).

Larva.—Unknown.

Holotype.—Male, Union, S.C., April 23, 1961. U.S. National Museum type No. 73412.

Paratypes.—Two males with same data as for holotype. Deposited with holotype.

Distribution.—South Carolina (fig. 10).

Host.—Unknown.

Biology.—Unknown.

Discussion.—In addition to the generic characters, the nearly entirely black coloration and darkly infuscated wings will separate this unique species from those of other related genera. The male genitalia also differ remarkably from species in related genera.

The species name is an arbitrary combination of letters and is to be treated as a noun.

Genus AMETASTEGIA A. Costa

Ametastegia A. Costa, 1882, p. 198; Dalla Torre, 1894, p. 42; Rohwer, 1910c, p. 111; Enslin, 1914, p. 241; Malaise, 1933, p. 58; Ross, 1937a, p. 85; Ross, 1937b, p. 91; Ross, 1951, p. 57; Benson, 1952, p. 90; Takeuchi, 1952, p. 36; Lorenz and Kraus, 1957, p. 95.

Type-species: *Ametastegia fulvipes* A. Costa. Monotypic.

Acomodyctium Ashmead, 1898, p. 309; Ross, 1937a, p. 85 (= *Ametastegia* A. Costa).

Type-species: *Strongylogaster abnormis* Provancher. Monotypic.

Prottemphytus Rohwer, 1909, p. 92; Malaise, 1947, p. 31.

Type-species: *Emphytus coloradensis* Weldon. Monotypic.

Ametastegia subgenus *Prottemphytus*: Ross, 1937a, p. 87; Ross, 1937b, p. 92; Ross, 1951, p. 57.

Emphytina Rohwer, 1911a, p. 399; Ross, 1937, p. 87 (= *Prottemphytus* Rohwer).

Type-species: *Emphytina pulchella* Rohwer. Original designation.

Simplemphytus MacGillivray, 1914b, p. 363; Ross, 1937a, p. 87 (= *Prottemphytus* Rohwer).

Type-species: *Simplemphytus pacificus* MacGillivray. Monotypic.

Unitaxonus MacGillivray, 1921, p. 32; Ross, 1937a, p. 87 (= *Ametastegia* A. Costa).

Type-species: *Unitaxonus repentinus* MacGillivray. Original designation.

Adult.—Antenna moderately long, slender; second segment as long as broad; third segment longer than fourth segment; apical four segments reduced in length (pl. XI, 148). Clypeus shallowly emarginated, emargination truncate or V-shaped (pl. XI, 150, 151); malar space various; genal carina extending above eye but usually absent behind postocellar area; mandibles each bidentate.

Tarsal claw with inner tooth shorter than outer tooth, inconspicuous basal lobe present (pl. XI, 149). Hindbasitarsus subequal to or shorter than remaining tarsal segments together. Forewing with first sector of *Rs* present or absent; veins *M* and *Rs* + *M* meeting *Sc* + *R* at same point; anal crossvein nearly perpendicular (pl. XI, 146). Hindwing with cells *Rs* and *M* both absent; anal cell petiolate, petiole shorter than cell width (pl. XI, 147). Hindwing of male without peripheral vein.

Larva.—The following combination of characters will be helpful for separating the larvae of this genus: Only annulets 2 and 4 of each abdominal segment 1 to 9 setiferous (pl. XIV, 179); thoracic legs normal, trochanter shorter than tibia; each mandible with one seta on outer surface; mesal ridge of right mandible without teeth on inner surface (pl. XIV, 181). The larvae may be unicolorous or have brownish stripes on the body and various brown patches on the head.

Discussion.—All species of *Ametastegia* are small, elongated insects. The anal crossvein of the forewing, which is much more perpendicular and not as oblique as in other genera, the absence of cells *Rs* and *M* in the hindwing, the shallowly emarginated clypeus, and the bidentate mandibles will separate members of this genus.

About 28 world species are known, and 15 are treated here for North America, more than the 7 Ross (1937a) included in his revision. Two of the species are found south of the United States, *A. championi* from Guatemala and *A. mexicana* from Mexico. The rest of the increase in species since Ross' work is the result of splitting the group Ross treated as *A. recens*. Though all species that have previously gone under the name *recens* are separated by having the venter of the abdomen pale, there are a number of other differences in the female lancet, coloration, and hosts. The species treated here that would have gone under the name *recens* are *A. becria*, *angusta*, *aperta*, *pulchella*, *recens*, *rocia*, and *xenia*. The rest of the species segregated by Ross remain the same.

Two species, *glabrata* and *equiseti*, have been put in a separate subgenus, *Protemphytus*, by some authors because of the presence of the first free sector of vein *Rs* in the forewing. I have not retained subgenera. The larvae, habits, and general structure of all species are so similar that there seems to be little basis for recognition of subgenera. The males present the biggest problem in the genus. Though some males are readily separated and some do have distinct characters in the genitalia, many, especially those in the

recens group, show few or no reliable characters for separation. Consequently, much of the taxonomy is based on females.

Most species of this genus are associated with herbaceous plants, such as *Rumex*, *Polygonum*, and *Viola*, but two species are found on *Salix*. Most species have several generations a year. When mature, the larva searches for a special medium to bore into and form a pupal cell. These may be apples or other fruits, berry canes, and under bark. Such records do not constitute the true host on which the larva actually feeds. Larvae found in these secondary hosts are always prepupae, a stage that cannot be identified.

Keys to *Ametastegia* Species

Adults

- | | |
|--|----|
| 1. First free sector of vein <i>Rs</i> of forewing present (pl. XI, 146) ----- | 2 |
| First free sector of vein <i>Rs</i> of forewing absent ----- | 3 |
| 2. Abdomen entirely black ----- <i>A. glabrata</i> (Fallén) | |
| Abdomen with orange band ----- <i>A. equiseti</i> (Fallén) | |
| 3. Abdomen black ----- | 4 |
| At least venter of abdomen and usually considerable areas on dorsum of abdomen white to yellowish orange ----- | 8 |
| 4. Coxae, trochanters, and basal portion of femora whitish ----- | 5 |
| Legs black, sometimes whitish on tibiae only ----- | 6 |
| 5. Pronotum black; mesepisternum always black ----- <i>A. pallipes</i> (Spinola) | |
| Posterior margin of pronotum narrowly white; mesepisternum usually with white spot on lower posterior section, at least in females ----- <i>A. articulata</i> (Klug) | |
| 6. Posterior margin of pronotum white; tegulae sometimes brownish [clypeus without tooth at center] ----- <i>A. mexicana</i> (Cameron) | |
| Pronotum and tegulae black ----- | 7 |
| 7. Clypeus shallowly, circularly emarginated, without center tooth (pl. XI, 151) ----- <i>A. coloradensis</i> (Weldon) | |
| Clypeus with a deeper V-shaped emargination, with small tooth at center (pl. XI, 150) ----- <i>A. tener</i> (Fallén) | |
| 8. From Guatemala ----- <i>A. championi</i> (Cameron) | |
| From the United States and Canada ----- | 9 |
| 9. Female ----- | 10 |
| Male ----- | 16 |
| 10. Pectus and lower portion of mesepisternum white to orange ----- | 11 |
| Pectus black; mesepisternum black with white spot or streak on lower, posterior portion ----- | 12 |
| 11. Serrulae of lancet broadly rounded and close together (pl. XII, 161) ----- <i>A. pulchella</i> (Rohwer) | |
| Serrulae of lancet pointed at apices, farther apart (pl. XIII, 162) ----- <i>A. recens</i> (Say) | |
| 12. Serrulae of lancet flat (pl. XI, 156) ----- <i>A. becera</i> , n. sp. | |
| Serrulae of lancet deeper, rounded or pointed at apices (pl. XI, 154; pl. XIII, 163, 165) ----- | 13 |

13. Serrulae of lancet narrow, lobelike, rounded at apices (pl. XI, 154) ----- *A. aperta* (Norton)
 Serrulae of lancet broad, pointed at apices (pl. XIII, 163, 165) -- 14
14. Antenna slender, usually more than twice head width; western --
 ----- *A. angusta* (Kincaid)
 Antenna stouter, usually less than twice head width; eastern ---- 15
15. Serrulae of lancet with one anterior subbasal tooth, moderately deep, asymmetrical (pl. XIII, 165); postocellar area as broad as or slightly broader than long ----- *A. xenia*, n. sp.
 Serrulae of lancet with two or three anterior subbasal teeth, deep, more nearly symmetrical (pl. XIII, 163); postocellar area usually longer than broad ----- *A. rocia*, n. sp.
16. Pectus and lower half or more of mesepisternum white to orange ----- *A. pulchella* (Rohwer), *A. recens* (Say)
 Pectus and mesepisternum black except for white spot or streak on lower posterior portion of mesepisternum ----- 17
17. Western ----- *A. angusta* (Kincaid)
18. Eastern -----
 ----- *A. aperta* (Norton); *A. beera*, n. sp.; *A. rocia*, n. sp.; *A. xena*, n. sp.

Larvae

1. Dark-brown spot on apex of 10th tergum; dorsum of body light brown, extending laterally to spiracles ----- *equiseti* (Fallén)
 Tenth tergum and body unicolorous, without brown spots ----- 2
2. Hairs on head numerous, frons with more than 15; head mostly dark brown, sometimes paler in front (pl. XIV, 185) -----
 ----- *pallipes* (Spinola)
 Hairs moderately abundant or sparse on head, frons with 12 or less (pl. XIV, 180); head usually with brown spots on vertex or behind eyes ----- 3
3. Head usually with two brown spots on vertex and upper half of frons dark brown ----- *glabrata* (Fallén)
 Head usually with a dark-brown spot on vertex, and one behind each eye; frons entirely pale (pl. XIV, 180) ----- *articulata* (Klug)

Descriptions of *Ametastegia* Species

Ametastegia angusta (Kincaid)

Emphytus angustus Kincaid, 1900, p. 360; Konow, 1905, p. 105; Ross, 1937a, p. 88 (= *recens* Say).

Female.—Length, 6.0 to 6.4 mm. Antenna black with basal two segments partly or all white; head black with clypeus, labrum, base of each mandible and maxilla and labium white. Thorax black with posterior half of pronotum, tegulae, and large spot on lower posterior margin of mesepisternum white. Legs white; apex of each tarsus infuscated. Abdomen with sterna white, terga mostly black with posterior margins and mesial areas of central segments

and all of apical tergum white; sheath black. Wings hyaline; veins and stigma black.

Clypeus shallowly circularly emarginated, without tooth at center. Antenna slender, equal to about twice or more head width. Malar space slightly less than diameter of front ocellus. Forewing with first free sector of vein *Rs* absent. Sheath straight above and below, rounded at apex. Lancet with about 14 serrulae, each serrula low, with 1 anterior and 4 or 5 rather coarse posterior sub-basal teeth (similar to pl. XIII, 165).

Male.—Length, 5.5 to 5.8 mm. Coloration and structure similar to those of female. Genitalia as in plate XIII, 166, 167.

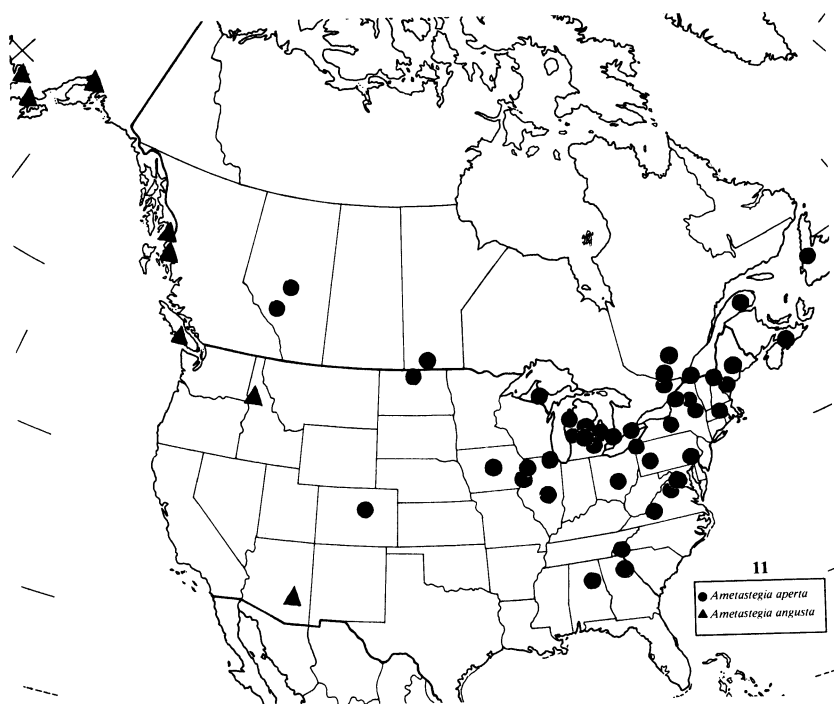
Larva.—Unknown.

Holotype.—At the U.S. National Museum, type No. 5308, ♂, labeled “Kukak Bay, Alaska, July 4, '99,” “Harriman Expedition '99, T. Kincaid, collector.”

Distribution.—Alaska, British Columbia, Idaho, Arizona (fig. 11).

Host.—One specimen from British Columbia was collected on alder.

Biology.—Unknown. All specimens examined were collected



in June and July. Some of the adults were taken on the tundra at Naknek, Alaska.

Discussion.—The slender antennae, black pectus, mostly pale abdomen, and low serrulae of the lancet will distinguish this species. It is apparently more adapted to arctic conditions than some other species of *Ametastegia*.

Ametastegia aperta (Norton)

Emphytus apertus Norton, 1861, p. 155; Norton, 1867, p. 228; Provancher, 1878, p. 67; Provancher, 1883, p. 193; Dalla Torre, 1894, p. 113; Konow, 1905, p. 105; MacGillivray, 1916, p. 57; Ross, 1937a, p. 88 (= *recens* Say).

Emphytus leucostoma Rohwer, 1908a, p. 110; Ross, 1937a, p. 88 (= *recens* Say). Preoccupied by *Emphytus leucostomus* Costa, 1890.

Emphytina plesia Rohwer, 1911a, p. 402. New name for *leucostoma* Rohwer.

Female.—Length, 6.3 to 6.8 mm. Antenna black; head black with clypeus, labrum, base of each mandible, and maxillary and labial palpi white. Thorax black with posterior margin of pronotum, tegulae, and spot on posterior margin of mesepisternum white. Legs white to yellow with midtarsus and hindtarsus infuscated. Abdomen orange with basal plates, second tergum, lateral areas of midterga, eighth tergum, and sheath back. Wings hyaline to very lightly uniformly infuscated; veins and stigma brown.

Clypeus shallowly emarginated, without center tooth. Malar space equal to diameter of front ocellus. Forewing with first free sector of vein *Rs* absent. Sheath straight above, rounded below and at apex. Lancet with about 14 serrulae, each serrula narrow, lobe-like, far apart, with 1 anterior and 8 to 10 fine posterior subbasal teeth on ventral margin of lancet (pl. XI, 154).

Male.—Length, 5.2 to 5.7 mm. Coloration and structure similar to those of female. Genitalia as in plate XIII, 166, 167.

Larva.—Unknown.

Holotypes.—*E. aperta* Norton: At the Museum of Comparative Zoology, Harvard University, ♀, labeled "178" and "MCZ type 26318." *E. leucostoma* Rohwer: At the University of Nebraska, ♂, "Ute Creek, Colo., 9,000', July 4, R. W. Dawson."

Distribution.—Eastern North America west to Colorado (fig. 11): Newfoundland (insular), Nova Scotia, Quebec, Maine, New Hampshire, Massachusetts, Ontario, New York, Pennsylvania, Maryland, District of Columbia, Virginia, North Carolina, Georgia, Alabama, Michigan, Ohio, Illinois, Iowa, Manitoba, North Dakota, Alberta, Colorado.

Host.—Unknown.

Biology.—Unknown. Adults have been collected from May to August. Host labels on specimens probably indicate pupation sites: Ex *Polyporus betulinus* and *Carpinus*.

Discussion.—This species has been confused with *recens* with which it was placed in synonymy. The following combination of characters will distinguish *aperta*: Black pectus, mostly orange abdomen, and the rather long, lobelike serrulae of the lancet. The female lancet is most distinctive for this species.

Ametastegia articulata (Klug)

Tenthredo articulatus Klug, 1818, p. 284; Ross, 1951, p. 82.

Emphytus articulatus: Norton, 1867, p. 233; Konow, 1905, p. 105.

Harpiphorus articulatus: Dalla Torre, 1894, p. 153.

Ametastegia articulata: Smith, 1973a, p. 29.

Dolerus inornatus Say, 1824, p. 319; LeConte, 1859, p. 213; Smith 1973a, p. 29 (= *articulata* Klug).

Emphytus inornatus: Norton, 1861, p. 155; Norton, 1867, p. 227; Provancher, 1878, p. 66; Provancher, 1883, p. 192; Dalla Torre, 1894, p. 118; Konow, 1905, p. 106; MacGillivray, 1916, p. 57.

Ametastegia inornata: Ross, 1937a, p. 89; Ross, 1951, p. 58.

Emphytus aztecus Cameron, 1888, p. 163; Dalla Torre, 1894, p. 113; Konow, 1905, p. 105. New synonymy.

Emphytus halitus MacGillivray, 1923d, p. 14; Ross, 1937a, p. 89 (= *inornatus* Say). New synonymy.

Female.—Length, 5.8 to 6.3 mm. Antenna and head black; clypeus whitish or black; labrum and maxillary and labial palpi whitish. Thorax black with posterior margin of pronotum white; tegulae brownish to white; small white spot usually present on lower posterior margin of mesepisternum, sometimes absent. Legs usually white to yellow with extreme base of each coxa, apical half of hindtibia, and all of hindtarsus black; occasionally legs are mostly black with only most of each coxa, trochanter, and basal half of each femur white. Abdomen black, sometimes each segment with narrow white band on posterior margin; sheath black. Wings lightly, uniformly infuscated; veins and stigma black.

Clypeus shallowly, circularly emarginated, without median tooth in emargination; malar space equal to or slightly less than diameter of front ocellus. Forewing with first sector of vein *Rs* absent. Sheath straight above, rounded below and at apex. Serrulae of lancet moderately deep, each serrula pointed at apex and with three or four anterior and seven or eight fine posterior subbasal teeth (pl. XI, 155).

Male.—Length, 4.7 to 5.0 mm. Coloration similar to that of female; legs usually with each coxa and trochanter more black than that described for female. Structure similar to that of female.

Genitalia with parapenis triangular, penis valve oblong, with short spine on dorsoapical margin and longitudinal crease on lateral surface (pl. XIII, 166, 167).

Larva.—Mature larva, 12 to 17 mm long. Head amber to brown with darker brown areas on vertex and behind eyes, those behind eyes extending to eyespot; eyespot and apex of each mandible dark brown to black. Body unicolorous, probably green when alive.

Frons with fewer than 12 hairs (pl. XIV, 180). Clypeus with 4 setae; labrum with 6 setae; epipharynx with arcuate row of 11 to 15 spines on each half (pl. XIV, 183); left mandible with 3 sharp ventral teeth, 2 sharp and 1 truncate dorsal teeth and 1 mesial tooth connected by ridge to outer dorsal tooth and inner ventral tooth; right mandible with 3 ventral teeth, the inner 2 close together, 2 dorsal teeth, the outer one broad and truncate, and 1 mesial tooth connected by ridge to inner dorsal tooth; each mandible with 1 seta on outer surface (pl. XIV, 181, 182); maxillary palpus 4-segmented, second segment with 1 seta, palpifer with 4 setae; stipes with 1 seta, lacinia with row of 11 to 13 spines (pl. XIV, 184); labial palpus 3-segmented, second segment with 1 seta, submentum with 6 setae.

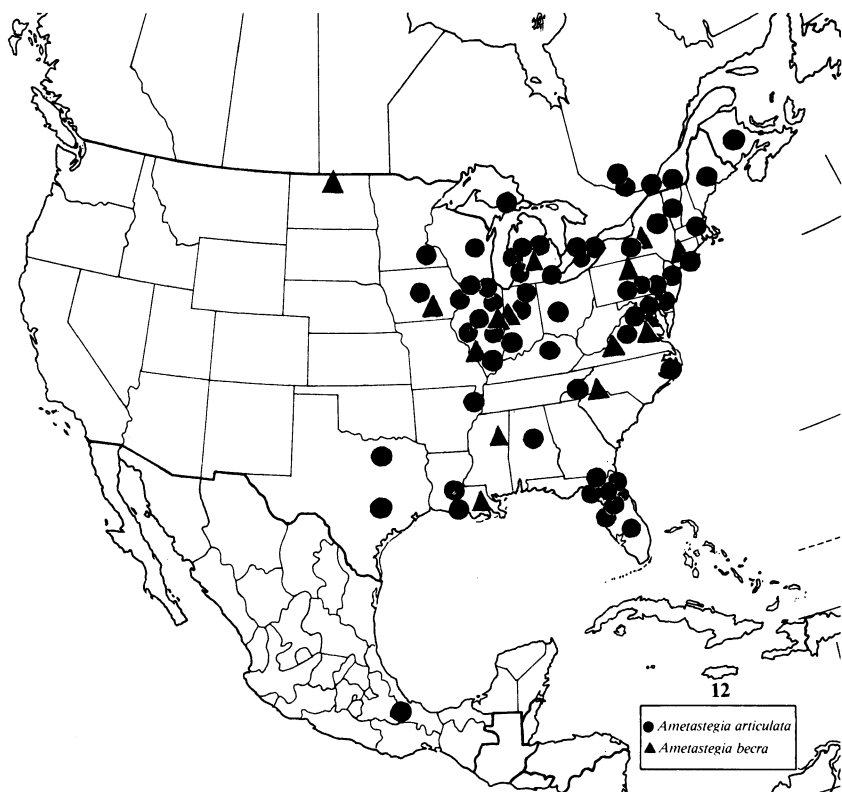
Thoracic legs normal, five-segmented, trochanter shorter than femur. Abdominal segments 1 to 9 each six-annulate; annulets 2 and 4 setiferous and with several minute tubercles; postspiracular, surpedal, and subspiracular lobes each with several setae and tubercles (pl. XIV, 179); several setae on inner surface of each proleg; suranal and subanal areas with numerous setae; 10th tergum without dark plate.

Holotypes.—*T. articulatus* Klug: At the Zoological Museum of Berlin, ♂, from Baltimore, Md. (Smith, 1973a). *D. inornatus* Say: Probably lost. *E. aztecus* Cameron: At the British Museum (Natural History), London, type No. 1.345, ♂, labeled "Orizaba, H. H. S. and F. D. G., Dec. 1887." *E. halitus* MacGillivray: At the Illinois Natural History Survey, ♂, "Freeport, Ill., July 16, '98, J. G. Needham."

Distribution.—Eastern North America west to Minnesota, Texas, and south into Mexico (fig. 12): New Brunswick, Quebec, Maine, Vermont, Massachusetts, Connecticut, Ontario, New York, Pennsylvania, New Jersey, Maryland, Delaware, District of Columbia, Virginia, North Carolina, Florida, Michigan, Ohio, Indiana, Kentucky, Alabama, Wisconsin, Illinois, Minnesota, Iowa, Arkansas, Louisiana, Texas, Veracruz.

Host.—*Rumex* sp., *Polygonum erectum* L.

Biology.—According to information associated with Hopkins' No. 10783^d, larvae were collected from *Polygonum erectum* at



Falls Church, Va., on May 31, 1921. Adults were reared and emergence took place from June 28 to July 10 of the same year. Several adults were placed with the host, oviposited, and a second generation began the same year. The larvae fed on the undersurface of the leaves "first skeletonizing, later eating irregular holes in the leaves." When mature, the larvae bored into cornstalks and wood for pupation.

Host data for a number of adult specimens include "emerged from grape vine," "from thorn," "cornstalks," and "wood." All these represent a pupation site, not a true host for the larva.

Discussion.—The white posterior margin of the pronotum, partly white legs, and black abdomen will distinguish this species. The narrower malar space, which is equal to or less than the diameter of the front ocellus, will also help distinguish *articulata* from *pallipes*.

The correct identity of *articulata* was unknown until reported by Smith (1973a). The larva, host, and life history have not before been described.

Ametastegia becri, new species

Female.—Length, 6.1 to 6.6 mm. Antenna and head black, clypeus, labrum, base of each mandible, and maxillary and labial palpi white. Thorax black with posterior half of pronotum, tegulae, and spot on lower posterior margin of mesepisternum white. Legs white to orange with apex of hindtibia and hindtarsus infuscated, foretarsus and midtarsus sometimes infuscated. Abdomen white to orange below, black above with posterior margin of each segment and mesial areas white to orange; basal plates black, apical tergum white; sheath black. Wings hyaline; veins and stigma black.

Clypeus shallowly, circularly emarginated, without tooth at center. Malar space equal to diameter of front ocellus. Antennal length less than twice width of head. Sheath straight above and below, rounded at apex. Lancet with about 14 serrulae, each serrula low, flat, with 1 anterior and 8 to 10 posterior subbasal teeth (pl. XI, 156).

Male.—Length, 5.5 to 5.8 mm. Coloration and structure similar to those of female. Genitalia as in plate XIII, 166, 167.

Larva.—Unknown.

Holotype.—Female, "Plummers I., Maryland, 15-II-11, P. R. Myers, coll." U.S. National Museum type No. 73413.

Paratypes.—NEW YORK: Southold, L.I., VI-11-46, Roy Latham (1 ♀). PENNSYLVANIA: Avis, Pine Creek, 8-8-1947, W. L. Brown (1 ♀). MARYLAND: Plummers Is., 24-4-15, R. C. Shannon (1 ♀); Plummers Is., 26-VI-1912, H. S. Barber (1 ♀). DISTRICT OF COLUMBIA: Georgetown, H. H. Smith (1 ♀). VIRGINIA: Falls Church, June 11, 1921 (1 ♀); Giles Co., Appal. Tr. and Castle Rocks, Mt. Lake area, 30 June 1967, H. Greenbaum (1 ♀). NORTH CAROLINA: L. Junaluska, 6-VI, 56, H. V. Weems, Jr. (1 ♀, 2 ♂♂). MICHIGAN: Ag. Coll., collection C. F. Baker (1 ♀). INDIANA: Turkey Run, V-29-1930, H. H. Ross (1 ♀). ILLINOIS: Kickapoo S. P., Oakwood, July 31, 1947, Sand. and Stann. (1 ♀); St. Jacob, May 6, 1943, H. H. Ross and S. (2 ♀ ♀); Dubois, May 14, '16 (1 ♀). MISSISSIPPI: Oktibeha Co., Starkville, 11-24-IX-1971, malaise trap, C. Sartor (1 ♀). IOWA: Co. 3, June 26, 1936, D. Millsbaugh (1 ♀). LOUISIANA: Shriever, Terrebonne Co., VI-18-17 (1 ♀); Harahan nr. N. Orleans, Aug. 17, 1944, C. L. Remington (1 ♀). NORTH DAKOTA: Bottineau Co., Sec. 21. T. 161, R. 75, 26-VII-1971, Malaise trap, Hopk. 54152Q, A. D. Tagestad, collector (1 ♀). At the U.S. National Museum, Illinois Natural History Survey, Flor-

ida State Collection of Arthropods, collection of H. Greenbaum, and Cornell University.

Other Specimens.—NEW YORK: Ithaca, 3 Aug. '89 (1 ♀).

Distribution.—New York to North Carolina, west to North Dakota, Iowa, and Louisiana (fig. 12).

Host.—Unknown.

Biology.—Unknown.

Discussion.—This species is similar in coloration to *aperta*, *rocia*, and *xenia*, but it is distinguished from these and other species of *Ametastegia* by the flat serrulae of the lancet. I could not distinguish the males of *becra* from *aperta*, *rocia*, and *xenia*.

The species name is an arbitrary combination of letters and is to be treated as a noun.

Ametastegia championi (Cameron)

Emphytus championi Cameron, 1883, p. 35; Dalla Torre, 1894, p. 114 (*championii*); Konow, 1905, p. 105.

Ametastegia championi: Smith, 1972a, p. 258.

Female.—Length, 8.0 mm. Antenna and head black. Thorax black with posterior margin of pronotum, tegulae, and spot on mesepisternum whitish. Legs yellow orange with midtarsus, hindtarsus, apical third of hindtibia, and extreme apex of midtibia black; apical four foretarsal segments infuscated. Abdomen orange with basal plates and sheath black. Wings lightly uniformly infuscated; veins and stigma black.

Clypeus shallowly, circularly emarginated, without median tooth. Malar space equal to diameter of front ocellus. Forewing with first free sector of vein *Rs* absent. Tarsal claw with small inner tooth near base. Sheath straight above, rounded below and at apex. Lancet not examined.

Male.—Length, 4.8 mm. Coloration and structure similar to those of female except apical two abdominal segments and coxae, which are black. Genitalia as in plate XIV, 171, 172.

Larva.—Unknown.

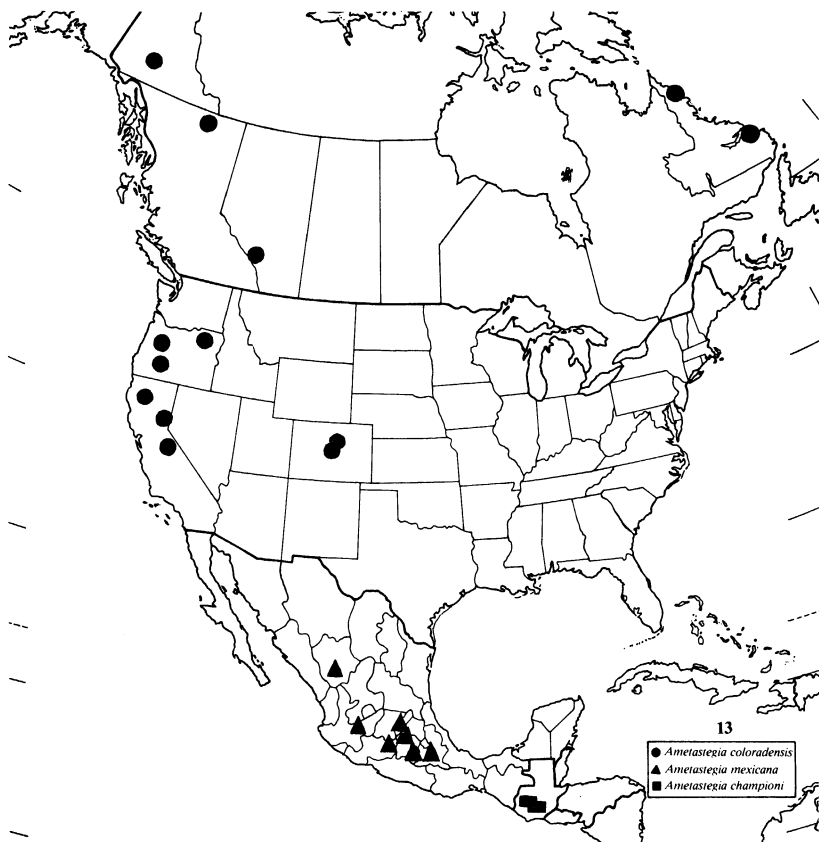
Holotype.—In the British Museum (Natural History), London, type No. 1.346, ♀, labeled "Purula, Guatemala, Champion."

Distribution.—Guatemala: Purula (type); Ingenio, April 28, 1926, J. M. Aldrich (1 ♂) (fig. 13).

Host.—Unknown.

Biology.—Unknown.

Discussion.—The coloration and distribution will separate *championi* from other species of *Ametastegia*. The orange legs



and abdomen are especially distinctive. The only female I saw was the type, and I did not dissect out the lancet for study. This is the southernmost species of *Ametastegia* in the Western Hemisphere.

Ametastegia coloradensis (Weldon)

Emphytus coloradensis Weldon, 1907, p. 304; Rohwer, 1908b, p. 179.

Protemphytus colorandensis: Rohwer, 1909, p. 92.

Ametastegia coloradensis: Ross, 1937a, p. 89; Ross, 1951, p. 58.

Emphytus hiulcus MacGillivray, 1923d, p. 15; Ross, 1937a, p. 89 (= *coloradensis* Weldon).

Female.—Length, 4.9 to 5.2 mm. Black; foretibia and midtibia sometimes brownish; posterior margin of pronotum sometimes narrowly whitish. Wings uniformly, lightly infuscated; veins and stigma black.

Clypeus shallowly, circularly emarginated, without median tooth (pl. XI, 151). Malar space about $1\frac{1}{2}$ times diameter of front ocellus. Tarsal claw with small inner tooth. Forewing with first free sector of vein *Rs* absent. Sheath rounded above and below, rounded at apex (pl. XI, 153). Lancet with about 14 serrulae, each serrula low, flattened, pointed on anterior edge, with no anterior and about 10 posterior subbasal teeth (pl. XII, 157).

Male.—Length, 4.4 to 4.7 mm. Coloration and structure similar to those of female. Genitalia as in plate XIV, 173, 174.

Larva.—Unknown.

Holotypes.—*E. coloradensis* Weldon: U.S. National Museum type No. 27721, ♂, "Colo. 2204," "13," "det. MacG." *E. hiulcus* MacGillivray: At the Illinois Natural History Survey, ♀, "Colo. 2195."

Distribution.—Colorado and Alberta to the west coast, with several records from Labrador (fig. 13): Newfoundland (Labrador), Colorado, Alberta, Yukon Territory, British Columbia, Oregon, California.

Host.—Unknown.

Biology.—All adults were captured in June and July. One specimen from California was taken from the gallery of a bark beetle, "*Dendroctonus monticola* in *Pinus contorta*"; this is undoubtedly a pupation site.

Discussion.—This species is closest to *tener* in coloration, but *coloradensis* has a shallowly emarginated clypeus without a median tooth and has a broader, more rounded sheath.

Ametastegia equiseti (Fallén)

Tenthredo equiseti Fallén, 1808, p. 60.

Taxonus equiseti: Dalla Torre, 1894, p. 111, lists numerous references to this species in European literature prior to 1894; Konow, 1905, p. 109.

Ametastegia equiseti: Enslin, 1914, p. 242; Conde, 1934, p. 180; Ross, 1937a, p. 88; Berland, 1947, p. 231; Ross, 1951, p. 57; Benson, 1952, p. 90; Maxwell, 1955, p. 79; Lorenz and Kraus, 1957, p. 96; Verzhutskii, 1966, p. 74.

Taxonus innominatus MacGillivray, 1901, p. 585; MacGillivray, 1916, p. 47; Ross, 1937a, p. 88 (= *equiseti* Fallén).

Strongylogastroidea depressata MacGillivray, 1921, p. 31; Ross, 1937a, p. 88 (= *equiseti* Fallén).

Unitaxonus repentinus MacGillivray, 1921, p. 31; Ross, 1937a, p. 88 (= *equiseti* Fallén).

Unitaxonus rumicis MacGillivray, 1921, p. 31; Ross, 1937a, p. 88 (= *equiseti* Fallén).

Hemitaxonus dedititius MacGillivray, 1923b, p. 77; Ross, 1937a, p. 88 (= *equiseti* Fallén).

Strongylogastroides rufocinctella MacGillivray, 1923d, p. 32; Ross, 1937a, p. 88 (= *equiseti* Fallén).

Ametostegia (!) *bizonata*: Blackman and Stage, 1924, p. 154.

Female.—Length, 6.4 to 6.8 mm. Antenna black; ventral surface sometimes brownish. Head black; labrum and maxillary and labial palpi whitish. Thorax black with tegulae white. Legs orange; each coxa with basal half black, apical half white; each tarsus blackish. Abdomen with basal plates and second segment black, segments 3 to 5 and sometimes part of 6 orange, apical two or three segments and sheath black. Wings hyaline; veins and stigma black.

Clypeus shallowly, circularly emarginated, without median tooth. Malar space equal to diameter of front ocellus. First free sector of vein *Rs* of forewing present. Sheath straight above, rounded below and at apex. Serrulae of lancet low, each rounded at apex and with two or three anterior and six or seven posterior subbasal teeth (as in pl. XII, 158).

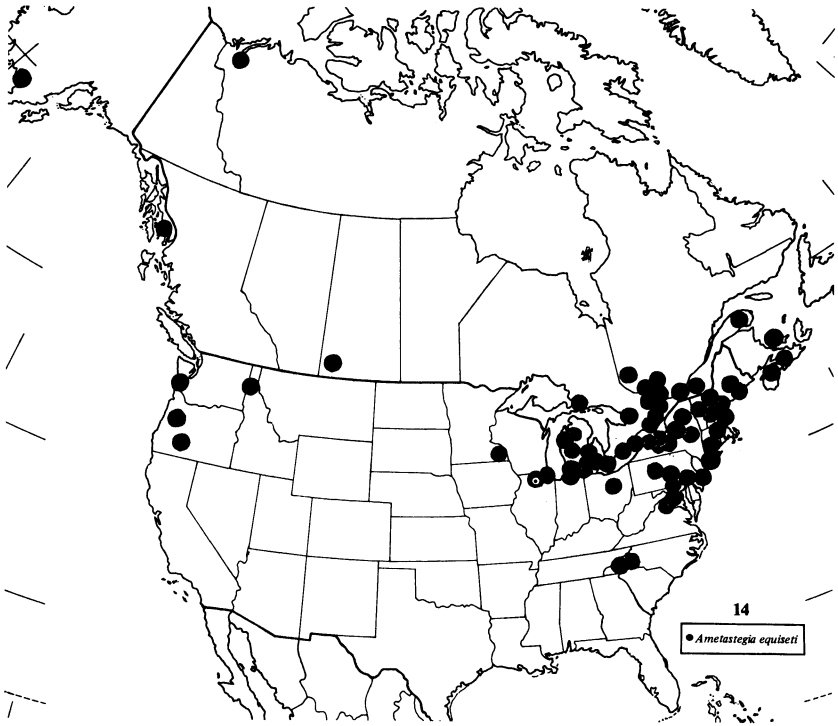
Male.—Length, 5.4 to 5.7 mm. Coloration and structure similar to those of female. Genitalia with parapenis triangular; penis valve oblong, with short spine on dorsoapical margin, without longitudinal crease on lateral surface (pl. XIII, 170).

Larva.—Similar to the larva of *articulata* with the following exceptions: 10th tergum with dark-brown spot on apical half; dorsum of body light brown, extending laterally to spiracles; tubercles of body small, but more discernible with one on each spiracular and surpedal lobe, one on each side of annulet 2 and two or three on each side of annulet 4 of each abdominal segment 1 to 9; head dark brown behind and up to eyes, paler in front and below eyes.

The larva was described by Lorenz and Kraus (1957) and the internal larval anatomy by Maxwell (1955).

Holotypes.—Fallén's types are at the Zoological Museum, Lund, Sweden. MacGillivray's types are at the Illinois Natural History Survey: *T. innominatus*, ♂, "Saranac Inn, N.Y., Aug. 3, 1900, NYS Coll."; *S. depressata*, ♀, "Me. Exp. St. Lot 1684, Sub. 39"; *U. repentinus*, ♀, "Ithaca, N.Y. 5 July '18"; *U. rumicis*, ♀, "9-21-1," "Ithaca, N.Y."; *H. dedititius*, ♂, "Ore. Exp. Sta. Acc. 1781," "G. F. Mozzette, Collector"; *S. rufocinctella*, ♀, "VI-1-1906," "S. A. Shaw, Hampton, N.H."

Distribution.—Europe and the Mediterranean region, Siberia; widespread in North America (fig. 14): Prince Edward Island, Nova Scotia, Quebec, Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Ontario, New York, Pennsylvania, New Jersey, Maryland, Virginia, North Carolina, Michigan, Ohio, Illi-



nois, Minnesota, Northwest Territories, Saskatchewan, Idaho, Alaska, Washington, Oregon.

Hosts.—Recorded only from *Rumex* sp. in North America. Benson (1952) gave the following hosts in England: *Chenopodium album* L., *Polygonum persicaria* L., *Rumex acetosella* L., and *Lythrum salicaria* L. Other recorded hosts in Europe are *Plantago* (Lorenz and Kraus, 1957) and *Ribes grossularia* L. (Berland, 1947).

Biology.—Though a common species, little work has been done on its life history. There are at least two generations a year in Europe, and adult collection data on North American specimens suggest several generations as they have been collected from spring to the end of August. Host labels on specimens giving raspberry canes and cork stoppers in a rearing cage are only pupation sites. Specimens emerged from hickory dead 3 and 4 years (Blackman and Stage, 1924).

Discussion.—This is a distinct species with little color variation. Adults may be distinguished from *glabrata*, the only other species of *Ametastegia* with the first free sector of vein *Rs* present in the forewing, by the orange band on the abdomen. Larvae may be

separated by the light-brown dorsum of the body and the brown spot on the 10th tergum.

The following names are considered synonymous with *equiseti* in European literature (Enslin, 1914; Berland, 1947): *Tenthredo bicolor* Klug, *T. bizonata* Zetterstedt, and *Macrophya angustula* Kawall.

Ametastegia glabrata (Fallén)

Tenthredo glabrata Fallén, 1808, p. 108.

Taxonus glabrata: Dalla Torre, 1894, p. 111, lists references to this species in European literature prior to 1894; Konow, 1905, p. 109.

Ametastegia glabrata: Enslin, 1914, p. 242; Rohwer, 1915, p. 198; Newcomer, 1916, p. 1; Dustan and Gilliatt, 1916, p. 45; Blackman and Stage, 1924, p. 153; Petherbridge, 1924, p. 24; Conde, 1927, p. 78; Miles, 1931, p. 358; Ross, 1937a, p. 87; Jary and Austin, 1938, p. 11; Berland, 1947, p. 232; Lange, 1950, p. 23; Ross, 1951, p. 57; Massee, 1952, p. 157; Hill, 1952, p. 59; Benson, 1952, p. 91; Jancke, 1953, p. 119; Marle, 1953, p. 205; Jong, 1955, p. 325; Lorenz and Kraus, 1957, p. 97; Miles, 1958, p. 402; Pond, 1961, p. 168; Zuk, 1961, p. 21; Cymorek, 1963, p. 194; Zayanchkaskas, 1963, p. 153; Verzhutskii, 1966, p. 74.

Taxonus nigrisoma Norton, 1862a, p. 119; Norton, 1868, p. 211; Provancher, 1878, p. 165; Provancher, 1883, p. 214; Jack, 1893, p. 183; Dalla Torre, 1894, p. 112; Fletcher, 1903a, p. 78; Fletcher, 1903b, p. 80; Fletcher, 1904, p. 62; Konow, 1905, p. 109; Chittenden and Titus, 1905, p. 40; Webster, 1908, p. 310; Rohwer, 1915c, p. 198 (= *glabrata* Fallén).

Strongylogaster abnormis Provancher, 1885, p. 10; Dalla Torre, 1894, p. 133; Dyar, 1895c, p. 311; Dyar, 1897b, p. 199; Rohwer, 1915c, p. 199 (= *glabrata* Fallén); Smith, 1975b, p. 294.

Taxonus abnormis: Konow, 1905, p. 108.

Strongylogastroidea potulenta MacGillivray, 1923d, p. 31; Ross, 1937a, p. 87 (= *glabrata* Fallén).

Female.—Length, 7.4 to 7.8 mm. Antenna and head black; labrum whitish. Thorax entirely black. Legs orange with extreme base of each coxa and all of hindtarsus black. Abdomen entirely black. Wings lightly uniformly infuscated.

Clypeus shallowly emarginated, nearly truncate. Malar space equal to diameter of front ocellus. Forewing with first free sector of vein *Rs* present. Sheath straight above, rounded below and at apex. Serrulae of lancet moderately deep, each serrula pointed at apex, with two to three anterior and seven to eight posterior sub-basal teeth (pl. XII, 158).

Male.—Length, 6.1 to 6.4 mm. Coloration and structure similar to those of female. Genitalia with parapenis triangular; penis valve with short dorsoapical spine, no crease on lateral surface (pl. XIII, 168, 169).

Larva.—Similar to the larva of *articulata* except the following: Head usually with two dark-brown spots, one on each side of

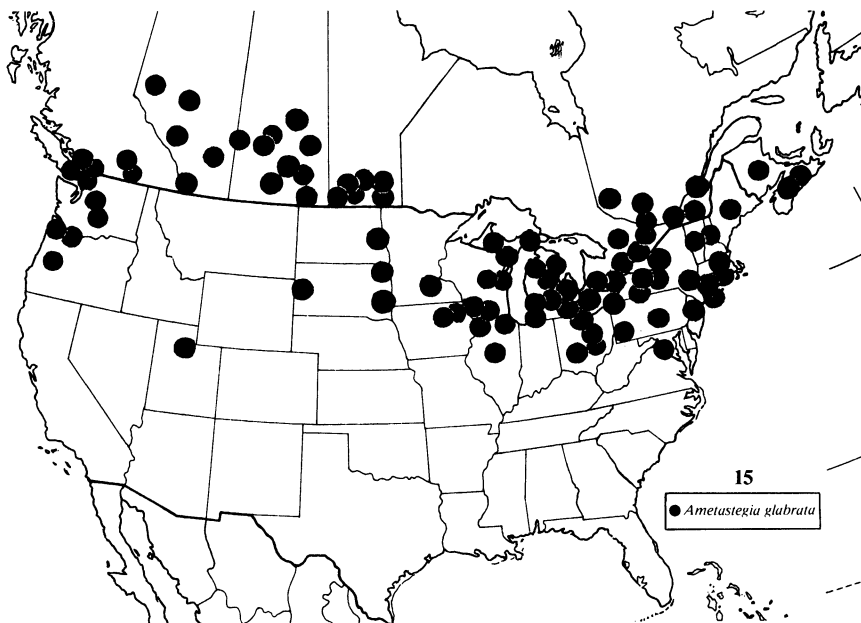
vertex and with the upper half of frons dark brown; these areas more distinct in some specimens than others. It may be separated from *equiseti* by the lack of a brown spot on the 10th tergum and lack of light brown on the dorsum of the body.

The larva was described by Lorenz and Kraus (1957).

Holotypes.—Fallén's types are at the Zoological Museum, Lund, Sweden. *T. nigrisomus* Norton: Not located. *S. abnormis* Provancher: At the Museum of Quebec, Laval University, ♀, with yellow label "1147" (Smith, 1975b). *S. potulenta* MacGillivray: At the Illinois Natural History Survey, ♀, "6/20," "Poughkeepsie, N.Y."

Distribution.—Europe and the Mediterranean region to Siberia; widespread in North America (fig. 15): Nova Scotia, New Brunswick, Quebec, Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, Ontario, New York, Pennsylvania, New Jersey, Maryland, District of Columbia, Michigan, Ohio, Wisconsin, Illinois, Minnesota, Iowa, Manitoba, Saskatchewan, North Dakota, South Dakota, Alberta, Utah, British Columbia, Washington, Oregon.

Hosts.—Recorded from *Rumex crispus* L., *Rumex* sp., and *Polygonum* sp. in North America. In England, Benson (1952) recorded *Chenopodium*, *Polygonum*, *Rumex*, *Rheum*, and *Fagopyrum*. Additionally for Europe, Lorenz and Kraus (1957) recorded *Plantago*,



Solanum, *Lythrum*, *Ribes*, and *Viola*. Zayanchkauskas (1963) gave the following hosts in Russia: *Bidens*, *Chenopodium*, *Fagopyrum*, *Lythrum*, *Plantago*, *Polygonum*, *Rheum*, *Rumex*, *Salix*, *Solanum*, *Viola*, *Malus*, *Philadelphus*, *Prunus*, *Ribes*, *Rubus*, *Zea*. All of these may not be plants on which the larva feeds. The larva for this species is well known for boring into apples, but this is not a true host plant; see under Biology.

Biology.—Jack (1893), Dustin and Gilliatt (1916), Chittenden and Titus (1905), and Newcomer (1916) gave accounts of the biology of this species. Adults usually begin emerging the last part of May and go through three generations a year. Of utmost importance is the pupation site, a habit which has resulted in many biological notes in North America and Europe. After feeding, the larvae search for a substance to bore into and form a pupal cell. Such sites include apples, cornstalks, cherry twigs, and raspberry canes as recorded on specimen labels; also, dead and decaying hickory, dead from 3 to 6 years and well along in decay (Blackman and Stage, 1924), pears (Jong, 1955), cedar sidings (Zuk, 1961), and dry timber (Cymorek, 1963). Finding a larva in any one of these is only incidental and depends on the proximity of this secondary host to the true host plant. Since apples are a most suitable pupation site, this species has gained status as an economic pest.

Discussion.—The black abdomen and presence of the first free sector of vein *Rs* in the forewing will distinguish *glabrata* from all other species of *Ametastegia*.

The body of the prepupa, the stage found in apples, is unicolorous pale green with the head amber, the area above and behind the eyes dark brown, and the eyespot black. The prepupa is distinguished from the last feeding instar by having three teeth in a linear row on each mandible. Because prepupae of other species of *Ametastegia* are not known, I cannot give further distinguishing characters.

This species has been known as the dock false-worm but now bears the approved common name dock sawfly.

The following names are considered synonymous with *glabrata* in European literature (Enslin, 1914; Berland, 1947): *Tenthredo agilis* Klug, *T. rufipes* Lepeletier, and *Ametastegia fulvipes* A. Costa, the last being the type-species of *Ametastegia*.

Ametastegia mexicana (Cameron)

Emphytus mexicanus Cameron, 1883, p. 35; Dalla Torre, 1894, p. 119; Konow, 1905, p. 106.

Ametastegia mexicana: Smith, 1972a, p. 258.

Female.—Length, 6.3 to 6.8 mm. Antenna and head black; labrum and maxillary and labial palpi brownish to whitish. Thorax black with posterior margin of pronotum white and tegulae brownish to black. Legs mostly black with extreme apex of forefemur, and all of foretibia and foretarsus white; sometimes midtibia and base of hindtibia white. Abdomen and sheath black. Wings uniformly, lightly infuscated; veins and stigma black.

Clypeus shallowly circularly incised, without median tooth. Malar space a little longer than diameter of front ocellus. First free sector of vein *Rs* of forewing absent. Sheath straight above and below, rounded at apex. Lancet with about 14 serrulae, each serrula low, with 1 anterior and 6 or 7 coarse posterior subbasal teeth (pl. XII, 159).

Male.—Length, 5.8 to 6.1 mm. Coloration and structure similar to those of female. Genitalia as in plate XIV, 175, 176.

Larva.—Unknown.

Holotype.—At the Muséum d'Histoire Naturelle, Genève, Switzerland, ♀, labeled: "Angong" "TYPUS" "Emphytus mexicanus Cam. (Type)" "Cameron exam."

Distribution.—Mexico (fig. 13): Puebla, Morelos, Durango, Jalisco, Querétaro, Mexico, Michoacán.

Host.—Unknown.

Biology.—Unknown. Adults were collected in May, July, and December.

Discussion.—This species is close to *coloradensis* and *tener* in coloration but is separated from both by the narrow white hindmargin of the pronotum, from *tener* by the lack of a tooth in the clypeal emargination, and from *coloradensis* by the deeper serrulae of the lancet. It is close to *articulata*, but *articulata* has the coxae, trochanters, and femora mostly white and has a white streak on the mesepisternum.

Ametastegia pallipes (Spinola)

Tenthredo pallipes Spinola, 1808, p. 19.

Ametastegia pallipes: Enslin, 1914, p. 239; Ross, 1937a, p. 89; Ross, 1951, p. 58; Benson, 1952, p. 91; Maxwell, 1955, p. 79; Peterson, 1956, p. 11; Lorenz and Kraus, 1957, p. 97.

Protomphytus pallipes: Hellén, 1948, p. 43; Rungs, 1949, p. 172.

Tenthredo pallipes Provancher, 1878, p. 66; Ross, 1937a, p. 89 (= *pallipes* Spinola); Smith, 1975b, p. 300. Homonym and synonym.

Emphytus pallipes: Konow, 1905, p. 106.

Emphytus canadense Kirby, 1882, p. 204; Dyar, 1894, p. 185 (*canadensis*). New name for *pallipes* Provancher.

Emphytus pallidipes Dalla Torre, 1894, p. 119. Emendation. Numerous references given for this species in European literature prior to 1894; Berland, 1947, p. 229.

- Empria cavata* MacGillivray, 1911a, p. 305; MacGillivray, 1916, p. 54; Ross, 1937a, p. 90 (= *pallipes* Spinola).
Empria cetaria MacGillivray, 1921, p. 33; Ross, 1937a, p. 90 (= *pallipes* Spinola).
Emphytus halesus MacGillivray, 1923d, p. 13; Ross, 1937a, p. 90 (= *pallipes* Spinola).
Emphytus heroicus MacGillivray, 1923d, p. 14; Ross, 1937a, p. 90 (= *pallipes* Spinola).
Emphytus hiatus MacGillivray, 1923d, p. 14; Ross, 1937a, p. 90 (= *pallipes* Spinola).
Emphytus hospitus MacGillivray, 1923d, p. 15; Ross, 1937a, p. 90 (= *pallipes* Spinola).
Emphytus hyacinthus MacGillivray, 1923d, p. 16; Ross, 1937a, p. 90 (= *pallipes* Spinola).

Female.—Length, 5.6 to 5.9 mm. Antenna and head black; apical half of clypeus sometimes brownish; labrum and maxillary and labial palpi whitish. Thorax black; tegulae white. Legs mostly white with base of each coxa black; hindfemur, apex of hindtibia, and each tarsus sometimes infuscated. Abdomen black. Wings very lightly, uniformly infuscated.

Clypeus shallowly, circularly emarginated. Malar space nearly twice diameter of front ocellus. Forewing with first free sector of vein *Rs* absent. Sheath straight above, rounded below and at apex. Serrulae of lancet moderately deep, each rounded at apex and with four or five anterior and seven or eight posterior subbasal teeth (pl. XII, 160).

Male.—Unknown. Parthenogenetic.

Larva.—Similar to the larva of *articulata*, with the following differences: Head with rather dense erect hairs, frons with more than 15 hairs; head almost uniformly dark brown, somewhat paler in front and below eyes (pl. XIV, 185). The lack of a brown spot on the 10th tergum and lack of distinct brown spots on the head will separate *pallipes* from *glabrata* and *equiseti*.

The larva was described by Lorenz and Kraus (1957) and the internal larval anatomy by Maxwell (1955).

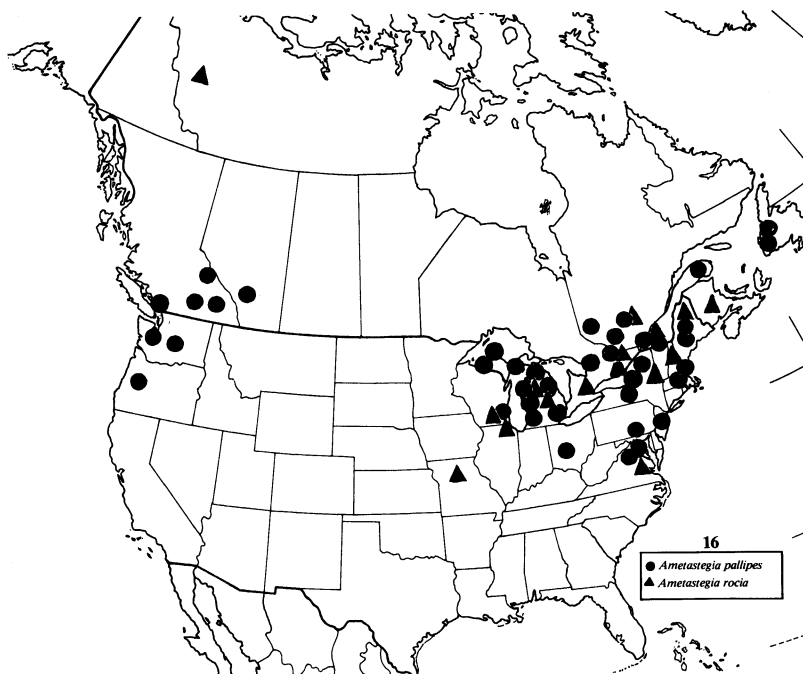
Holotypes.—Spinola's types are in Genova, Italy. *T. pallipes* Provancher: In the Provancher Collection, Museum of Quebec, Laval University, with labels "35" and "Emphytus pallipes," (Smith, 1975b). MacGillivray's types are at the Illinois Natural History Survey: *E. cavata*, ♀, "Oswego, N.Y., May 27, 1896"; *E. cetaria*, ♀, "119-1-2," "Ithaca, N.Y., 14 July 11"; *E. halesus*, ♀, "Corvallis," "5/13, Gooding collector"; *E. heroicus*, ♀, "Hamburg, N.Y., 6-6-09, M. C. V. coll."; *E. hiatus*, ♀, "Ithaca, N.Y., May, 1911"; *E. hospitus*, ♀, "5-20-1904," "Hampton, N.H., S. A. Shaw"; *E. hyacinthus*, ♀, "Forest Hills, Mass., V-18-17," "A. M. Wilcox, collector."

Distribution.—Europe and Mediterranean region to Siberia, Iceland; widespread in North America (fig. 16): Newfoundland (insular), Quebec, Maine, New Hampshire, Massachusetts, Ontario, New York, New Jersey, Pennsylvania, Maryland, District of Columbia, Virginia, Michigan, Ohio, Wisconsin, Alberta, British Columbia, Washington, Oregon.

Host.—*Viola* spp. Recorded from two species of *Geranium* in France by Berland (1947).

Biology.—Dyar (1894) found larvae abundant on cultivated pansies at Plattsburgh, N.Y., in September; adults emerged the following April. When mature, larvae sought decayed soft wood or some similar substance in which they bored a gallery and formed a pupal cell. According to Benson (1952) and Lorenz and Kraus (1957), there are three or more generations a year in Europe.

Discussion.—The coloration of this species is similar to that of *articulata*, but the entirely black pronotum and broader malar space of *pallipes* will distinguish the latter species. The host plant and numerous hairs on the head of the larvae will help distinguish that stage.



The following names are considered synonymous with *pallipes* in European literature (Enslin, 1914; Berland, 1947): *Tenthredo grossulariae* Klug, *Dolerus leucopodus* Lepeletier, *T. lapponica* Zetterstedt, and *Taxonus lacteilabris* A. Costa.

Ametastegia pulchella (Rohwer)

Emphytina pulchella Rohwer, 1911a, p. 400; Ross, 1937a, p. 88 (= *recens* Say).

Emphytina virginicus Rohwer, 1911a, p. 401; Ross, 1937a, p. 88 (= *recens* Say).

Female.—Length, 6.4 to 6.8 mm. Antenna black, sometimes with first segment brownish to white. Head black; clypeus, labrum, base of each mandible, maxilla, and labium white. Thorax black with most of pronotum, tegulae, lower two-thirds of mesepisternum, and pectus orange to white. Legs orange to white, each tarsus infuscated. Abdomen mostly orange to white with basal plates and lateral areas of each tergum black; apical segment white; sheath black.

Clypeus shallowly, circularly emarginated, without median tooth. Malar space equal to or slightly less than diameter of front ocellus. Forewing with first free sector of vein *Rs* absent. Sheath straight above and below, rounded at apex. Lancet with about 14 serrulae, each serrula broad, close together, relatively deep, rounded at apex, and with 2 or 3 anterior and 3 or 4 posterior subbasal teeth (pl. XII, 161).

Male.—Length, 5.5 to 6.0 mm. Coloration and structure similar to those of female. Genitalia as in plate XIII, 166, 167.

Larva.—Unknown.

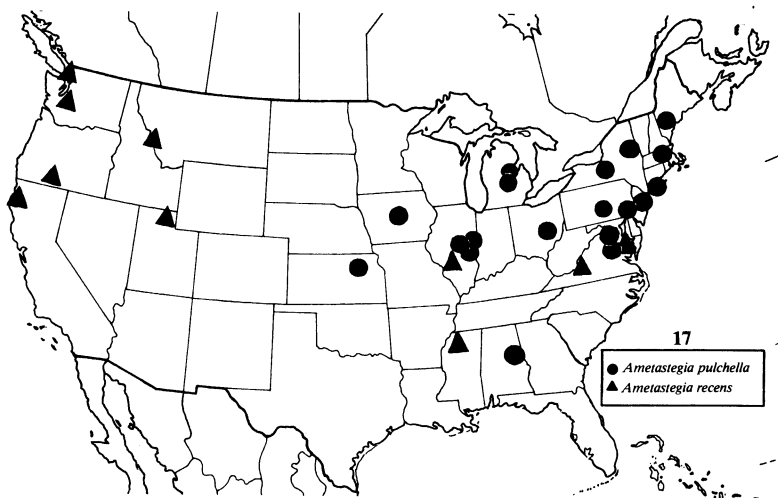
Holotypes.—Both are at the U.S. National Museum: *E. pulchella*, type No. 13977, ♀, "Germ't'n, Pa., V-2-01," "24"; *E. virginicus*, type No. 13978, ♀, "Dixie Lndg., Va. 5-27," "C. L. Marlatt, coll."

Distribution.—Eastern North America (fig. 17): Maine, Massachusetts, New York, New Jersey, Pennsylvania, Maryland, District of Columbia, Virginia, Alabama, Michigan, Ohio, Illinois, Iowa, Kansas.

Host.—*Polygonum* sp.

Biology.—Larvae of the specimens reared from *Polygonum* in Illinois were collected in May 1946, and an adult emerged in June of the same year.

Discussion.—This species, with the pale pectus, is similar to *recens* except for broader and more rounded serrulae of the lancet.



Also, this species normally has the basal antennal segments black, whereas they are most always white in *recens*.

Ametastegia recens (Say)

Emphytus recens Say, 1836, p. 221; LeConte, 1859, p. 680; Norton, 1861, p. 157; Norton, 1867, p. 232.

Harpiphorus recens: Dalla Torre, 1894, p. 154.

Poecilosoma recens: Konow, 1905, p. 104.

Ametastegia recens: Ross, 1937a, p. 88; Ross, 1951, p. 58.

Emphytus stramineipes Cresson, 1880a, p. 52; Provancher, 1886, p. 25; Dalla Torre, 1894, p. 121; Konow, 1905, p. 106; Ross, 1937a, p. 88 (= *recens* Say).

Emphytina pallidiscapa Rohwer, 1911a, p. 401; Ross, 1937a, p. 88 (= *recens* Say).

Emphytus yuasi MacGillivray, 1921, p. 31; Ross, 1937a, p. 88 (= *recens* Say).

Female.—Length, 5.7 to 6.3 mm. Antenna black, usually with basal two segments partly or all white. Head black; clypeus, labrum, base of each mandible, maxilla, and labium white. Thorax black with most of pronotum, tegulae, lower two-thirds of mesepisternum, and pectus orange to white. Legs white to yellow orange; midtarsus and hindtarsus sometimes infuscated. Abdomen white to orange below, above with basal plates and lateral areas on other segments black; apical tergum white; sheath black. Wings hyaline; veins and stigma black.

Clypeus shallowly, circularly emarginated; without median tooth. Malar space equal to or slightly less than diameter of front

ocellus. Forewing with first free sector of vein *Rs* absent. Sheath straight above and below, rounded at apex. Lancet with about 14 serrulae, each serrula moderately deep, pointed at apex, with 1 anterior and 3 or 4 posterior subbasal teeth (pl. XIII, 162).

Male.—Length, 5.3 to 5.7 mm. Coloration and structure similar to those of female. Genitalia as in plate XIII, 166, 167.

Larva.—Unknown.

Holotypes.—*E. recens* Say: Lost; a neotype designated by Ross (1937a) is in the Illinois Natural History Survey, ♂, "Urbana, Ill., July 5, 1889, in woods, C. A. Hart, Hart No. 520." *E. stramineipes* Cresson: At the Academy of Natural Sciences of Philadelphia, ♀, "W. T.," "T. No. 366." *E. pallidiscapa* Rohwer: U.S. National Museum type No. 13979, ♀, "3329, 3/84 [?], black birch." *E. yuasi* MacGillivray: At the Illinois Natural History Survey, ♀, "171-1, May 28, 1919."

Distribution.—Widespread in North America (fig. 17): District of Columbia, Virginia, Illinois, Mississippi, Montana, Utah, Washington, Oregon, California.

Host.—Unknown.

Biology.—A number of specimens, including some in the type series of *pallidiscapa*, bear the labels "black birch," "sawfly on *Betula nigra*, is. May, 1894," and "under bark of birch, is. March 25, '84." Though the last is probably a pupation site, it is not clear whether the others refer to the actual host or to a pupation site.

Discussion.—This species and *pulchella* are very similar in coloration, both having the venter of the abdomen, the pectus, and lower part of the mesepisternum pale. The only color difference is the usual black basal two antennal segments of *pulchella*. The primary difference is the female lancet, that of *pulchella* having large, rounded serrulae, and that of *recens* having smaller, pointed serrulae. I am unable to distinguish the males of the two species. The specimens from Eastern and Western United States appear identical to each other.

The concept of *recens* is much narrower here than that used by Ross (1937a) as explained in the discussion under *Ametastegia*.

Ametastegia rocia, new species

Female.—Length, 6.3 to 6.8 mm. Antenna and head black; clypeus, labrum, base of mandibles, labium, and maxilla white. Thorax black with posterior half of pronotum, tegulae, and spot on lower posterior margin of mesepisternum white. Legs white to orange with spot on upper margin of hindcoxa, extreme apex of hindtibia, and all of hindtarsus black; foretarsus and midtarsus

infuscated. Abdomen white to orange below, largely black above with posterior margin of each segment and mesial portion of each segment orange; apical tergum white and basal plates black; sheath black. Wings hyaline; veins and stigma black.

Clypeus shallowly circularly emarginated, without tooth at center. Malar space equal to diameter of front ocellus. Antenna length equal to less than twice head width. Sheath straight above and below, rounded at apex. Lancet with about 14 serrulae, each serrula pointed at apex, moderately deep with 3 or 4 anterior and 4 or 5 posterior subbasal teeth (pl. XIII, 163).

Male.—Length, 5.5 to 6.0 mm. Coloration and structure similar to those of female. Genitalia as in plate XIII, 166, 167.

Larva.—Unknown.

Holotype.—Female, Volo, Ill., June 11, 1936, in bog, Ross and Burks; on *Salix*, 47642, emgd. July 30. At the Illinois Natural History Survey.

Paratypes.—NEW BRUNSWICK: Lake Edward, white spruce, Rec: 40-L731A, F. I. Survey 1940, em. Mar. 18, 1941 (1 ♀). QUEBEC: Chatauguay, July '99 (1 ♀); Nominingue, 4-VI-1941, O. Peck (1 ♀). MAINE: Greenville, VI-1-1932 (1 ♀). NEW HAMPSHIRE: Concord, 6-1-28, ex burrows *Pissodes strobi* in white pine (1 ♀). ONTARIO: Ottawa, 23-V-1944, O. Peck (2 ♀ ♀); Britannia Bay, 1937, C. A. Hobbs (1 ♀); Gloucester Sta., willow, Rec: 43-1943, F. I. Survey 1943, em. (incubator) 1-III-1944 (1 ♀), same data but em. 28-II-1944 (1 ♀). NEW YORK: Albany Co., nr. Rensselaerville, Huyck Preserve, 11-14 June 1967, R. and J. Matthews (1 ♀). VIRGINIA: "Va.", June 1, '84 (1 ♀). MICHIGAN: Midland, June 2, 1940, C. W. Sabrosky (1 ♀); Omer, Rifle River, May 21, 1936, Frison and Ross (2 ♀ ♀). WISCONSIN: Dane Co., July 5, 1917, Wm. S. Marshall (1 ♀). ILLINOIS: Algonquin, 5-11-95 (1 ♀); same data as for holotype (1 ♀) and except for emergence dates, Aug. 1 (1 ♀, 1 ♂), Aug. 2 (1 ♀, 1 ♂), Aug. 7 (1 ♂), Aug. 10 (1 ♀), Aug. 17 (1 ♀); Volo Bog, on *Salix*, coll. June 12, 1936, emgd. Feb. 1937, 47642 (1 ♂). MISSOURI: Columbia, Malaise trap, 7AM-4PM, VIII-22-1967, F. D. Parker (1 ♀). NORTHWEST TERRITORIES: Norman Wells, 22-VI-1944, W. R. M. Mason (1 ♀). At the U.S. National Museum, Illinois Natural History Survey, Canadian National Collection, and University of Wisconsin.

Distribution.—New Brunswick and Quebec, south to Virginia, west to Northwest Territories and Missouri (fig. 16).

Host.—*Salix* sp.

Biology.—Larvae of this species were collected on *Salix* at Volo, Ill., in June 1936. Adults emerged the same year in late July

and August as well as the next year in February. It has also been reared from *Salix* in Ontario. Labels indicating hosts other than *Salix* probably refer to pupation sites.

Discussion.—The coloration of this species is similar to that of *becra*, *aperta*, and *xenia*, and the lancet of the female must be relied upon for separation from these species. Serrulae of the lancet of *rocia* are moderately deep, pointed at their apices, and nearly symmetrical with three or four anterior subbasal teeth. I could not distinguish the males of *rocia* from the three species mentioned previously.

The species name is an arbitrary combination of letters and is to be treated as a noun.

Ametastegia tener (Fallén)

Tenthredo tener Fallén, 1808, p. 109.

Emphytus tener: Dalla Torre, 1894, p. 121, lists references to this species in European literature prior to 1894; Konow, 1905, p. 106; Berland, 1947, p. 229.

Emphytina tener: Rohwer, 1911a, p. 400; Rohwer, 1927, p. 66.

Allantus tener: Enslin, 1914, p. 238.

Ametastegia tener: Ross, 1937a, p. 90; Ross, 1951, p. 58; Benson, 1952, p. 91; Lorenz and Kraus, 1957, p. 98; Verzhutskii, 1966, p. 75.

Simplemphytus pacificus MacGillivray, 1914b, p. 363; Wilson, 1915, p. 121; Rohwer, 1927, p. 66 (= *tener* Fallén); Schuh and Mote, 1948, p. 127.

Emphytina vanduzeei Rohwer, 1915b, 205; Rohwer, 1927, p. 66 (= *tener* Fallén).

Empria columna MacGillivray, 1923a, p. 54; Ross, 1937, p. 90 (= *tener* Fallén).

Emphytus haliartus MacGillivray, 1923d, p. 14; Ross, 1937a, p. 90 (= *tener* Fallén).

Emphytus haustus MacGillivray, 1923d, p. 14; Ross, 1937a, p. 90 (= *tener* Fallén).

Female.—Length, 6.0 to 6.3 mm. Entirely black, only foretibia whitish. Wings uniformly, lightly infuscated.

Clypeus moderately incised, emargination V-shaped with small median tooth (pl. XI, 150). Malar space nearly twice diameter of front ocellus. Forewing with first free sector of vein *Rs* absent. Sheath straight above, slightly rounded below, narrowly rounded at apex (pl. XI, 152). Serrulae of lancet low, each pointed at apex and with three or four anterior and six or seven posterior subbasal teeth (pl. XIII, 164).

Male.—Length, 5.7 mm. Coloration and structure similar to those of female. Genitalia with parapenis triangular; penis valve oblong, with minute tooth on dorsoapical margin and transverse crease on lateral surface (pl. XIV, 177, 178).

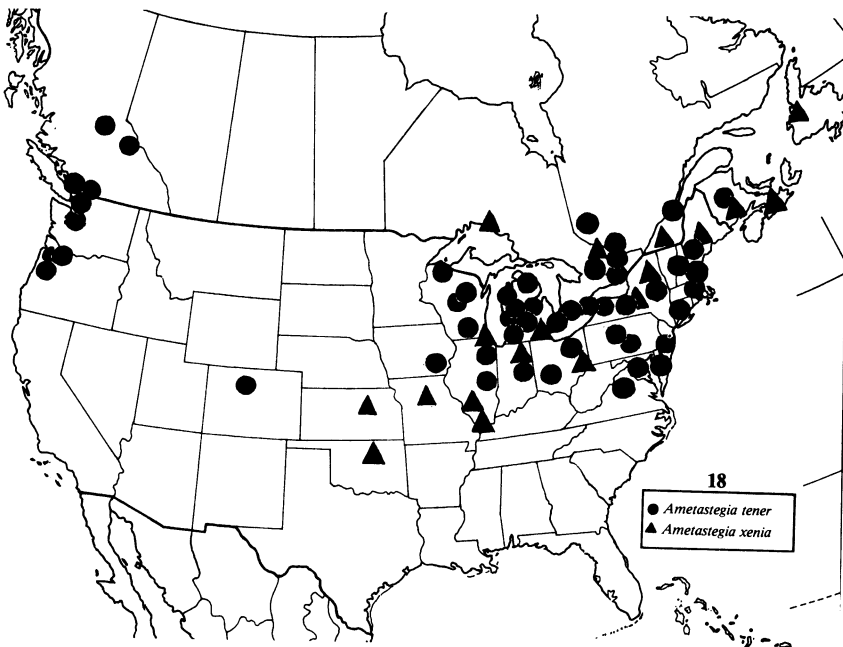
Larva.—Briefly described in literature but not adequately enough to separate from other larvae of this genus.

Types.—Fallén's types are at the Zoological Museum, Lund, Sweden. The type of *E. vanduzeei* Rohwer is at the U.S. National Museum, type No. 18378, ♀, labeled "Lancaster, N.Y., 6-2-12, M. C. Van Duzee." MacGillivray's types are at the Illinois Natural History Survey: *S. pacificus*, ♀, "Troutdale, Ore., 12-8-13"; *E. columna*, ♀, "Ira, Summit Co., O—"; *E. haliartus*, ♀, "5-29-17, campus," the second label is illegible; *E. haustus*, ♂, "Grand Isd., N.Y., 4-6-08, M. C. V. Coll."

Distribution.—Europe and the Mediterranean region to Siberia; widespread in North America (fig. 18): New Brunswick, Quebec, Maine, New Hampshire, Massachusetts, Connecticut, Ontario, New York, Pennsylvania, New Jersey, Delaware, Maryland, Virginia, Michigan, Ohio, Indiana, Wisconsin, Illinois, Iowa, Colorado, British Columbia, Washington, Oregon.

Hosts.—*Rumex* sp. Also recorded in Europe from *Filipendula* and *Cirsium* (Lorenz and Kraus, 1957), and *Cirsium lanceolatum* (L.) Hill and *Spiraea ulmaria* L. by Berland (1947).

Biology.—No information available for North America. In England (Benson, 1952), there are three or more generations a year, and the prepupa is found in stems and soft wood. It has been



reported to cause damage to vines, cherry, and other trees. In Russia, it is sometimes a pest in cultivated *Rumex*.

Various hosts recorded on specimen labels undoubtedly indicate the pupation site. These are *Hicoria*, stems of wild aster, ex burrows of *Pissodes strobi* in white pine, ex currant stems, from wheat stubble, berry cane, cherry, and abandoned larval mines in hickory.

Discussion.—This black species is close to *coloradensis* in color but the V-shaped emargination of the clypeus with a small center tooth will distinguish *tener*. The species *mexicana* (Cameron) also has mostly black legs, but *mexicana* has the hindmargin of the pronotum white and also lacks the small tooth in the emargination of the clypeus.

The following names are considered synonymous with *tener* in European literature (Enslin, 1914; Berland, 1947): *Tenthredo patellata* Klug, *Dolerus luctuosus* Lepeletier, *D. nigritus* Lepeletier, and *Taxonus glottianus* Cameron.

Ametastegia xenia, new species

Female.—Length, 6.2 to 6.5 mm. Antenna and head black; clypeus, labrum, base of each mandible, maxilla, and labium white. Thorax black with posterior half of pronotum, tegulae, and spot on lower posterior margin of mesepisternum white. Legs white to orange, each tarsus infuscated with hindtarsus more darkly so. Abdomen white to orange with basal plates, lateral margins of other segments, and sometimes anterior margins of segments black; apical tergum white; sheath black. Wings hyaline; veins and stigma black.

Clypeus shallowly circularly emarginated, without tooth at center. Malar space equal to diameter of front ocellus. First free sector of vein *Rs* of forewing absent. Sheath straight above and below, rounded at apex. Lancet with about 14 serrulae, each serrula moderately deep, pointed at apex, with 1 anterior and 4 or 5 posterior subbasal teeth (pl. XIII, 165).

Male.—Unknown.

Larva.—Unknown.

Holotype.—Female, New York: Albany Co., nr. Rensselaerville, Huyck Preserve, 20–23 August 1967, Malaise trap 1, R. and L. Matthews. U.S. National Museum type No. 73414.

Paratypes.—NEWFOUNDLAND: Corner Brook, VII-1967, N. L. H. Kraus (1 ♀). NOVA SCOTIA: 5 mi E. Antigonish, June 26, 1966, David R. Smith (1 ♀). NEW BRUNSWICK: Nerepis, 18 Aug., A. G. Leavitt (1 ♀). QUEBEC: Gracefield, 20-VI-1937, O. Peck (1 ♀). MAINE: Me. Expt. St. Lot 654,

Sub. 123, 9 Aug. '13 (1 ♀). ONTARIO: Nipigon, S66-4110-01, R'd *Salix* sp., em. 22-VIII-66, F. I. S. (1 ♀); Islington, 7-VI-1938 (2 ♀ ♀); Swansea, 3-VI-1938 (1 ♀). NEW YORK: Same data as for holotype except dates, June 6, 1967 (1 ♀), June 7, 1967 (1 ♀), June 9, 1967 (2 ♀ ♀), June 10, 1967 (2 ♀ ♀), June 16, 1967 (1 ♀); Ithaca, 2 July '85, G. F. Atkinson (1 ♀). MICHIGAN: Washtenaw Co., VI-6-67, R. W. Carlson (1 ♀). OHIO: Salineville (1 ♀). INDIANA: Columbia City, May 19, 1936, Eel River, Frison and Ross (1 ♀). ILLINOIS: U.S. National Forest, Union Co., Apr. 24, 1938, C. O. Mohr (1 ♀); Algonquin, Aug. 13, 1908, Nason 171 (1 ♀); Algonquin, Nason (1 ♀); E. St. Louis, June 14, 1946, M. W. Sanderson (1 ♀); Dongola, May 10, 1916 (2 ♀ ♀); Chemung, July 9, 1943, Sand. et al. (1 ♀); Alto Pass, Union Spgs., May 24, 1940, Mohr and Burks (1 ♀). KANSAS: Manhattan, 5 May 1950, at light, J. H. Harmon (1 ♀); Riley Co., June 1, 1950, Deep Creek, H. E. Evans (1 ♀). MISSOURI: Columbia, Malaise trap 4PM-7AM, VII-22-1961, F. D. Parker (1 ♀). OKLAHOMA: Wyandotte, July 15, 1931, A. J. Maxwell (1 ♀). At the U.S. National Museum, Illinois Natural History Survey, Canadian National Collection, and Cornell University.

Distribution.—Eastern North America, west to Kansas, Oklahoma (fig. 18).

Host.—One specimen was reared from *Salix* in Ontario.

Biology.—Unknown.

Discussion.—The coloration of this species is similar to that of *aperta*, *becra*, and *rocia*, but *xenia* differs from these primarily in the shape of the serrulae of the lancet as compared in plate XI, 154, 156; plate XIII, 163, 165. In *xenia*, the serrulae are moderately deep, not flat as in *becra*, and pointed at their apices, not rounded as in *aperta*. The serrulae of *xenia* are shallower, more asymmetrical, and with only one anterior subbasal tooth, whereas in *rocia*, the serrulae are deeper, more symmetrical, and with two or three anterior subbasal teeth. Also, the postocellar area in *rocia* is usually slightly longer than broad, but in *xenia* it is as broad as or lightly broader than long.

The species name as devised is an arbitrary combination of letters and is to be treated as a noun.

Genus MONOSOMA MacGillivray

Monsoma (!) MacGillivray, 1908, p. 368.

Type-species: *Taxonus inferentia* Norton. Original designation.

Monosoma: Viereck, 1910, p. 583 (emendation); MacGillivray, 1916, p. 59; Ross, 1937b, p. 91; Ross, 1951, p. 57 (= *Monostegia* O. Costa); Benson, 1952, p. 85.

Adult.—Antenna stout, second segment as long as broad, third segment longer than fourth segment, segments beyond third gradually decreasing in length. Clypeus shallowly emarginated, without median keel; malar space about $1\frac{1}{2}$ times width of front ocellus; genal carina present, extending to top of eye; mandibles each bidentate. Tarsal claw with small inner tooth, basal lobe absent. Hindtarsus long, slender, slightly shorter than length of hindtibia (pl. XV, 188); midtarsus longer than midtibia. Forewing with anal crossvein oblique; first free sector of vein *Rs* present; veins *M* and *Rs* + *M* meeting *Sc* + *R* at same point. Hindwing with cell *Rs* absent, cell *M* present; anal cell petiolate with petiole shorter than width of cell. Hindwing of male without peripheral vein. Abdomen without paired white spots on terga.

Larva.—Cannot be characterized; see *inferentia*.

Discussion.—This genus is close to *Monostegia*, but *Monostegia* lacks a genal carina and has the hindtarsus very short and stout. *Monosoma* is separated readily from *Empria* by the lack of paired white spots on the abdominal terga. There is no single character for the separation of this genus. Only this combination of characters can be used.

Only two species of *Monosoma* are known, one is Nearctic, the other, *M. pulverta* (Retzius), is European.

As pointed out by Ross (1937b), the original spelling, *Monsoma*, was a lapsus calami; therefore, the emended spelling by Viereck (1910) stands.

Description of *Monosoma* Species

Monosoma inferentia (Norton)

Poecilostoma inferentia Norton, 1868, p. 224; Dalla Torre, 1894, p. 127.

Poecilosoma inferentia: Dyar, 1895c, p. 308; Konow, 1905, p. 103.

Monsoma (!) *inferentia*: MacGillivray, 1908, p. 368.

Monosoma inferentia: Viereck, 1910, p. 583; MacGillivray, 1916, p. 59; Ross, 1937b, p. 91.

Monostegia inferentia: Ross, 1951, p. 57.

Strongylogaster albosectus Provancher, 1878, p. 168; Provancher, 1883, p. 217; Burks, 1958, p. 16; Smith, 1975b, p. 295 (= *inferentia* Norton).

Poecilostoma albosecta: Cresson, 1880a, p. 43; Dalla Torre, 1894, p. 125.

Poecilosoma albosecta: Konow, 1905, p. 103.

Monophadnus lineatus Kirby, 1882, p. 177; Dalla Torre, 1894, p. 163; Konow, 1905, p. 86; Ross, 1951, p. 57 (= *inferentia* Norton).

Monosoma inferentia var. *andronosa* Ross, 1932, p. 249; Ross, 1951, p. 57 (= *inferentia* Norton).

Female.—Length, 7.2 to 7.5 mm. Antenna and head black; anterior half of clypeus orange; labrum and maxillary and labial palpi whitish. Thorax mostly reddish brown; posterior margin of pronotum and tegulae whitish; usually black on pectus, spot on each lobe of mesonotum, posterior half of mesoscutellum, and all of metanotum. Legs entirely reddish brown, with inner surface of midfemur, hindfemur, apex of hindtibia, and each tarsus entirely infuscated to black. Abdomen dark orange to reddish brown with narrow white band on posterior margin of each segment. Wings lightly, uniformly infuscated.

Clypeus shallowly, circularly emarginated, without median keel; postocellar area longer than broad; in dorsal view, head broadened behind eyes; texture of head and mesopleuron dull to moderately shining. Sheath straight above and below, broadly truncated at apex (pl. XV, 187). Lancet short, each serrula low, flat, with no anterior and about six fine, posterior subbasal teeth (pl. XV, 186).

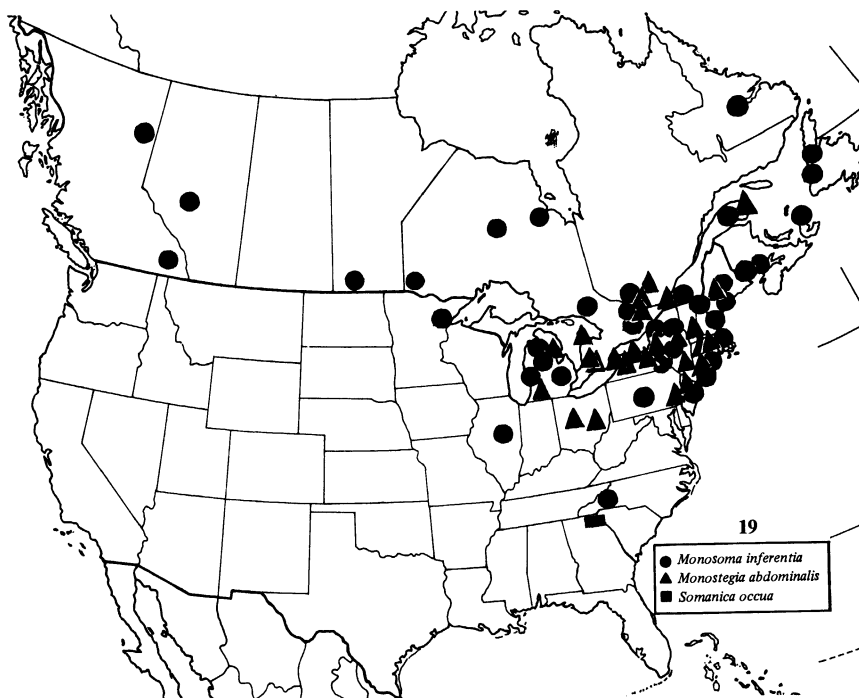
Male.—Length, 6.5 to 6.8 mm. Coloration variable, similar to that of female or with following parts black: Thorax except posterior margin of pronotum and tegulae, each coxa, femur and tarsus, abdomen except narrow white band on posterior margin of each segment. Structure similar to that of female. Genitalia as in plate XV, 189, 190.

Larva.—Dyar (1895c) described the larva, but I could not find Dyar's specimens and have not seen other specimens. Dyar's short description includes the following: "Pale leaf-green, covered with a white bloom; eye surrounded by a black spot; abdominal segments 6-annulate; 18 mm. long."

Types.—I could not locate Norton's type of *inferentia*. *Strongylogaster albosectus* Provancher is in the Museum of Quebec, Laval University, a ♀ with yellow label "96" and name label of the species; the right antenna is missing (Smith, 1975b). The type of *Monophadnus lineatus* Kirby is in the British Museum (Natural History), London, type No. 1.350, labeled "lineatus, Huds. Bay, Kirb." The type of Ross' variety, *andronosa*, is in the Canadian National Collection, Ottawa, ♀, from Biscotasing, Ontario, June 6, 1931, collected by Karl Schedl.

Distribution.—Eastern North America, west in Canada to British Columbia (fig. 19): Newfoundland (insular and Labrador), Nova Scotia, New Brunswick, Quebec, Maine, New Hampshire, Massachusetts, Connecticut, Ontario, New York, New Jersey, Pennsylvania, North Carolina, Michigan, Illinois, Minnesota, Manitoba, Alberta, British Columbia.

Host.—*Alnus* sp. The specimen from British Columbia was taken from *Salix* sp.



Biology.—The following information is from Dyar's unpublished notes associated with his code Nos. 3L and 9E as appear on reared specimens. Larvae of 3L were found feeding singly on alder at Keene Valley, N.Y., in June of 1894, and adults emerged the following spring. The larva of 9E was collected on "*Clethra alnifolia*" at Southhaven, L.I., N.Y., in the spring of 1898. Concerning this, Dyar stated "mature and does not seem to feed." I regard *Clethra* as a questionable host plant record.

Discussion.—Because of color variation, structural characters as given should be relied on for identification. The variety Ross described is only a dark color form.

Genus MONOSTEGIA O. Costa

Monostegia O. Costa, 1859, p. 60; Ross, 1937b, p. 91; Benson, 1938a, p. 184; Ross, 1951, p. 57; Benson, 1952, p. 85.

Empria subgenus *Monostegia*: Enslin, 1914, p. 210.

Type-species: *Tenthredo abdominalis* Fabricius. Designated by MacGillivray, 1908.

Poecilosoma subgenus *Nematoceros* Konow, 1896, p. 52, 54; Konow, 1905, p. 102; Rohwer, 1911b, p. 84 (= *Monostegia* O. Costa).

Type-species: *Tenthredo luteola* Klug. Monotypic.

Adult.—Antenna short, second segment as long as broad, third segment longer than fourth segment, segments beyond third gradually decreasing in length (pl. XV, 196). Clypeus shallowly emarginated, without median keel; malar space about $1\frac{1}{2}$ times diameter of front ocellus; genal carina absent; mandibles each bidentate. Tarsal claw with small inner tooth, no basal lobe (pl. XV, 191). Hindtarsus short, two-thirds length of hindtibia (pl. XV, 192); midtarsus subequal in length to midtibia. Forewing with anal crossvein oblique; veins *M* and *Rs* + *M* meet *Sc* + *R* at same point; first free sector of vein *Rs* present. Hindwing with cell *Rs* absent, cell *M* present; anal cell petiolate, petiole shorter than width of cell. Male without peripheral vein in hindwing.

Larva.—Difficult to distinguish from larvae of some other genera. See larval description for *abdominalis*.

Discussion.—This genus is similar to both *Empria* and *Monosoma*, but *Monostegia* lacks a genal carina, lacks paired white spots on the abdomen, and has the hindtarsus much shorter than the hindtibia. The single species in this genus is Holarctic, but it may have been introduced into North America.

The biology of *M. abdominalis* also differs from that of *Empria* and *Monosoma* in having more than one generation a year.

Description of *Monostegia* Species

Monostegia abdominalis (Fabricius)

Tenthredo abdominalis Fabricius, 1798, p. 216.

Rhadinoceraea abdominalis: Dalla Torre, 1894, p. 179, lists references for *abdominalis* in European literature prior to 1894.

Poecilosoma abdominalis: Konow, 1905, p. 102.

Empria abdominalis: Enslin, 1914, p. 210; Boulangé, 1932, p. 127; Conde, 1934, p. 178; Miles, 1936a, p. 463; Berland, 1947, p. 214.

Monostegia abdominalis: Ross, 1937b, p. 91; Benson, 1938a, p. 181; Ross, 1951, p. 56; Kontuniemi, 1951, p. 30; Benson, 1952, p. 85; Maxwell, 1955, p. 78; Lorenz and Kraus, 1957, p. 98; Zambelli, 1961, p. 322; Price, 1970, p. 491.

Tenthredo luteola Klug, 1818, p. 48; Konow, 1905, p. 102 (= *abdominalis* Fabricius).

Poecilosoma luteola: Loth, 1913, p. 60.

Monostegia martini MacGillivray, 1908, p. 366; Ross, 1937b, p. 91 (= *abdominalis* Fabricius).

Monostegia nearctica Rohwer, 1912b, p. 209; Ross, 1937b, p. 91 (= *abdominalis* (Fabricius)).

Female.—Length, 6.4 to 6.7 mm. Antenna black. Head black with clypeus entirely or only anterior half orange; labrum and mouthparts whitish. Thorax black with pronotum and tegulae

orange; upper portion of mesopleuron and lateral margins of mesonotum sometimes orange. Legs entirely orange; sometimes with base of each coxa black and each tarsus darkened. Abdomen orange with basal plates entirely or with only mesial portion black; sheath black. Wings very lightly, uniformly infuscated.

Clypeus shallowly, circularly emarginated; postocellar area only slightly broader than long; head shining. Sheath straight above, rounded below and at apex (pl. XV, 195). Serrulae of lancet low, each with 3 or 4 anterior and about 10 posterior subbasal teeth (pl. XV, 197).

Male.—Length, 6.4 mm. Coloration similar to that of female except abdomen, which is more infuscated to black above. Structure similar to that of female. Genitalia as in plate XV, 193, 194.

Larva.—Late instar, 11 to 18 mm long. Head amber with eyespot and apex of each mandible black and narrow brown line on vertex (pl. XVI, 202). Body unicolorous, without stripes, green when alive.

Clypeus with 4 setae; labrum symmetrical, with 6 to 8 setae; epipharynx with 14 to 18 spines on each half, several inner spines branched at their apices (pl. XVI, 201). Left mandible with three ventral teeth, inner tooth small, three dorsal teeth with inner tooth truncate, and one mesial tooth connected by ridge to outer dorsal tooth; right mandible with three large ventral teeth, one small tooth between middle and outer teeth, two dorsal teeth with inner tooth broad and truncate, and with two sets of mesial teeth, one near inner ventral teeth and divided into six or eight small teeth and the other with two teeth connected to outer dorsal tooth by ridge; each mandible with one seta on outer surface (pl. XVI, 198, 199). Maxillary palpus 4-segmented, 1 seta on second segment, palpifer with 3 setae, stipes with 1 seta, lacinia with 10 to 13 stout spines (pl. XVI, 200). Labial palpus three-segmented, second segment with one seta; submentum with six to eight setae.

Thorax without distinct ornamentation. Legs normal, five-segmented; trochanter shorter than tibia. Abdominal segments 1 to 9 each with 6 annulets; only second and fourth annulets of each segment setiferous, without tubercles; subspiracular and surpedal lobes each with 7 to 10 setae. Suranal and subanal areas setiferous. Inner surface of each proleg with several setae.

Holotypes.—The Fabrician types are in Copenhagen, Denmark. Klug's types are at the Zoological Museum of Berlin. *M. martini* MacGillivray: At the Illinois Natural History Survey, ♀, "May 14, '99, Westfield, Mass." *M. nearctica* Rohwer: At the U.S. National Museum, type No. 14699, ♀, "Newtonville, Mass., Je, 1906," "issued June 24, 1906."

Distribution.—Europe, England, and Spain to Asia Minor and Siberia; eastern North America (fig. 19): Quebec, Maine, Vermont, Massachusetts, Connecticut, Ontario, New York, Pennsylvania, New Jersey, Ohio, Michigan.

Hosts.—In North America, *abdominalis* has been bred from *Lysimachia nummularia* (L.), *L. vulgaris* L., and, in Quebec, from *L. terrestris* (L.) Britton, Sterns, and Poggenberg (Price, 1970). In Europe, it has been associated with *Lysimachia nummularia* (L.), *L. vulgaris* L., and *Anergallis arvensis* (L.) (Benson, 1952), *Glaux maritima* L. (Lorenz and Kraus, 1957), and *Lactuca scariola sativa* L. (Zambelli, 1961).

Biology.—The reader is referred to the study by Price (1970) on a population of *abdominalis* associated with *Lysimachia terrestris* in Quebec. In Quebec, there are two generations a year. Adults of the first generation appear in June and oviposit in the leaf of the host, usually on the outer, distal surface where 6 to 16 eggs are inserted in rows. Second-generation adults appear in August. Mature larvae overwinter in earthen cells in the ground. As reported in Europe, three generations may occur each year in the southern range of *abdominalis*. Biological studies in Europe by Loth (1913), Boulangé (1932), Miles (1936a), and Zambelli (1961) are all similar to that as reported by Price (1970) for North America.

Discussion.—This species may have been introduced into North America with its hosts, which are also imports from Europe. The record by Price (1970) on *L. terrestris* is the only host record on a native species.

The generic characters will serve to separate adults of this species. The best means to distinguish the larvae are by the host plants, the right mandible with its many small mesial teeth, and the lack of coloration except the narrow brown line on the vertex of the head.

This is a parthenogenetic species with males very rare. Only 1 of 66 specimens was a male in the study by Price (1970), and the male is unknown in England (Benson, 1952). The description of the male here is taken from one specimen from Ontario and another from Europe.

Other than *luteola* Klug, which is given in the synonymy, *Poecilosoma abdominalis* var. *analis* Konow, *P. abdominalis* var. *nigra* Konow, and *P. abdominalis* var. *rufinotus* Enslein are considered synonymous with *abdominalis* in European literature (Enslein, 1914; Berland, 1947).

Genus SOMANICA, new genus

Type-species: *Somanica occua*, new species.

Adult.—Antenna filiform, second segment longer than broad, third and fourth segments subequal in length, segments beyond fourth gradually decreasing in length (pl. XVI, 203). Clypeus circularly incised (pl. XVI, 204); no genal carina; each mandible bidentate; malar space narrow, less than half diameter of front ocellus. Propleurae broadly rounded and meeting on meson. Tarsal claw with long inner tooth, no basal lobe (pl. XVI, 205). Forewing with first free sector of *Rs* present, therefore with four cubital cells; anal crossvein oblique; *M* and *Rs* + *M* meeting *Sc* + *R* at same point. Hindwing with cells *Rs* and *M* both absent; anal cell petiolate, petiole equal to width of cell. Hindwing of male without peripheral vein. Abdomen without paired white spots on terga.

Larva.—Unknown.

Discussion.—The single species in this genus is very distinct but may be confused with *Monostegia* and *Haymatus* because of the lack of a genal carina. It is separated from *Monostegia* by the narrow malar space, subequal third and fourth antennal segments, lack of cell *M* in the hindwing, and the long inner tooth of the tarsal claw. From *Haymatus*, it is separated by the long second antennal segment, emarginated clypeus, and lack of cell *M* in the hindwing. From other genera, *Somanica* may be separated by those characters given in the preceding key to genera.

The name is an arbitrary combination of letters; gender, feminine.

Description of *Somanica* Species*Somanica occua*, new species

Female.—Length, 6.5 to 7.0 mm. Antenna black with underside of apical segments brownish. Head black with clypeus, labrum, mandibles except extreme apices, maxillary and labial palpi white. Thorax black, tegulae sometimes brownish. Legs black with apex of each coxa and each trochanter white, apical two-thirds of hind-femur red. Abdomen rufous with basal plates and apex of sheath black. Wings darkly, uniformly infuscated; veins and stigma black.

Head and body smooth and shining with short white pubescence. Postocellar area as long as broad. Sheath slender, tapering to rounded apex (pl. XVI, 208). Hindbasitarsus shorter than follow-

ing hindtarsal segments combined. Lancet with about 15 serrulae, each serrula low, nearly flat, with 3 to 5 anterior and 10 to 15 fine posterior subbasal teeth (pl. XVI, 209).

Male.—Length, 6.3 to 6.7 mm. Coloration as for female except tegulae which are white, legs which are mostly yellow orange with apex of foretarsus, extreme apex of midtibia, all midtarsus, and all hindtibia and hindtarsus infuscated to black. Structure as for female. Genitalia as in plate XVI, 206, 207; harpe oblong, parapenis triangular, penis valve oblong with apical spine.

Larva.—Unknown.

Holotype.—Female, Pine Mountain, Rabun Co., Ga., 1,400 ft, 15-V-57, W. R. M. Mason. In the Canadian National Collection.

Paratypes.—GEORGIA: Same data as for holotype except for dates 25-V-57 (3 ♀♀, 3 ♂♂), 14-V-57 (1 ♂); Rabun Co., Addie Branch, E., Fork Chattooga River, 2,400', 1-VIII-1957, J. G. Chillcott (1 ♂); Holcomb Cr., 1-VIII-1957, W. R. Richards (1 ♂). In the Canadian National Collection.

Distribution.—Georgia (fig. 19).

Host.—Unknown.

Biology.—Unknown.

Discussion.—A most distinctive shiny black and red species superficially similar to *Monostegia abdominalis* but distinguished by those characters given in the generic description.

Genus *APHILODYCTIUM* Ashmead

Aphilodyctium Ashmead, 1898, p. 310; Ross, 1937a, p. 90; Ross, 1937b, p. 92; Ross, 1951, p. 58.

Type-species: *Strongylogaster rubripes* Cresson. Original designation.

Polytaxonus MacGillivray, 1908, p. 368; MacGillivray, 1916, p. 58; Ross, 1937a, p. 90 (= *Aphilodyctium* Ashmead).

Type-species: *Taxonus robustus* Provancher. Original designation.

Adult.—Antenna filiform, second segment as long as broad, third segment slightly longer than fourth segment, segments beyond third gradually decreasing in length. Clypeus moderately circularly incised for about one-quarter of its medial length, with narrow rounded lateral lobes (pl. XVII, 211); genal carina present, extending to top of eyes; each mandible bidentate. Tarsal claw bifid, inner tooth shorter than outer tooth, with inconspicuous basal lobe. Forewing with anal crossvein oblique, first free sector of vein *Rs* present, veins *M* and *Rs* + *M* meeting *Sc* + *R* at same point. Hindwing with cells *Rs* and *M* both absent; anal cell petiolate with petiole shorter than width of cell. Hindwing of male without peripheral vein.

Larva.—Unknown.

Discussion.—This monotypic genus may be confused with *Ametastegia*, but the circularly emarginated clypeus and oblique position of the anal crossvein of the forewing will separate *Aphilodictium*. The bidentate mandibles will separate it from *Allantus*, which has the right mandible unidentate. The single species in this genus is widespread in North America.

Description of *Aphilodictium* Species

Aphilodictium fidum (Cresson)

Strongylogaster fidus Cresson, 1880a, p. 19; Dalla Torre, 1894, p. 134.

Taxonus fidus: Konow, 1905, p. 109.

Aphilodictium fidum: Ross, 1937a, p. 90; Ross, 1951, p. 58.

Strongylogaster rubripes Cresson, 1880a, p. 20; Dalla Torre, 1894, p. 137;

Ross, 1937a, p. 90 (= *fidum* Cresson).

Aphilodictium rubripes: Ashmead, 1898, p. 310.

Taxonus rubripes: Konow, 1905, p. 109.

Taxonus robustus Provancher, 1882, p. 294; Provancher, 1883, p. 743; Dalla Torre, 1894, p. 112; Konow, 1905, p. 109; Ross, 1937a, p. 90 (= *fidum* Cresson); Smith, 1975b, p. 301.

Polytaxonus robustus: MacGillivray, 1908, p. 368; MacGillivray, 1916, p. 58.

Taxonus parens Provancher, 1889, p. 9; Dalla Torre, 1894, p. 112; Konow, 1905, p. 109; Ross, 1937a, p. 90 (= *fidum* Cresson); Smith, 1975b, p. 300.

Taxonus lenis Rohwer, 1908a, p. 110; Ross, 1937a, p. 90 (= *fidum* Cresson).

Aphilodictium rubripes nigratarsis Rohwer, 1911a, p. 408; Ross, 1937a, p. 91 (= *fidum* Cresson).

Taxonus inclinatus MacGillivray, 1923b, p. 78; Ross, 1937a, p. 91 (= *fidum* Cresson).

Female.—Length, 7.3 to 7.6 mm. Antenna and head black; clypeus sometimes whitish to orange; labrum and maxillary and labial palpi whitish. Thorax black with posterior margin of pronotum and tegulae white. Legs orange with base of each coxa and all of each tarsus black; forebasitarsus and midbasitarsus sometimes orange. Abdomen variable, entirely black or mostly orange with basal plates, second segment and apical two or three segments black, with intermediates. Wings hyaline to very lightly, uniformly infuscated; veins and stigma black.

Malar space slightly wider than diameter of front ocellus; postocellar area slightly broader than long. Sheath straight above, rounded below and at apex. Serrulae of lancet low, broadly rounded, without distinct subbasal teeth (pl. XVII, 210).

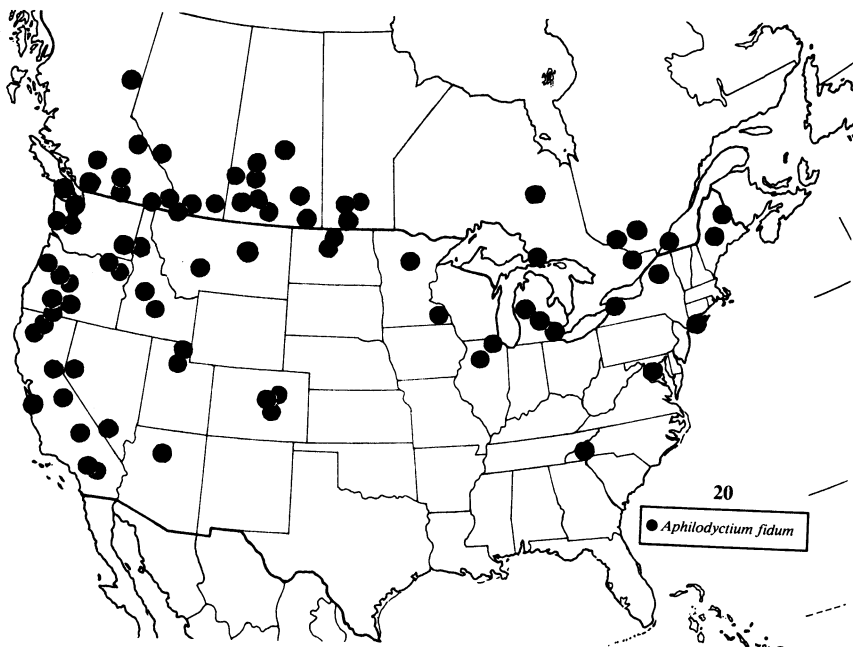
Male.—Length, 6.7 to 7.1 mm. Coloration and structure similar to those of female except each coxa and trochanter, which are usually black. Parapenis of genitalia produced at apex into long,

slender process; penis valve broad, oblong, without spine, and with oblique shelf on lateral surface (pl. XVII, 212, 213).

Larva.—Unknown.

Holotypes.—Cresson's types are at the Academy of Natural Sciences of Philadelphia: *S. fidus*, ♀, "Cala.," "T. No. 269, ♀"; *S. rubripes*, ♀, "Col." "T. No. 273." *T. robustus* Provancher: At the Museum of Quebec, Laval University, ♀, with yellow label "931" and name label "*Taxonus robustus* Prov." (Smith, 1975b). *T. parens* Provancher: A female in the Canadian National Collection is labeled "TYPE, *Taxonus parens* Pr., No. 120," "Vic. V.I. 1895, J. Fletcher," "*Taxonus parens* Prov." This specimen was collected 6 years after the description; the date on the specimen is probably an error (Smith, 1975b). Rohwer's types are in the U.S. National Museum: *T. lenis*, ♂, type No. 13981, "Colo. 1145"; *A. rubripes nigratarsis*, ♀, type No. 13982, "Steamboat Springs, Colo., May 27 (Cockerell)." *T. inclinatus* MacGillivray: At the Illinois Natural History Survey, ♂, "Corvallis, Ore., 5//13," "Hardman collector."

Distribution.—Widespread in North America (fig. 20): Quebec, Maine, Ontario, New York, Maryland, North Carolina, Michigan, Illinois, Minnesota, Manitoba, Saskatchewan, North Dakota,



Alberta, Montana, Colorado, Idaho, Utah, Nevada, Arizona, British Columbia, Washington, Oregon, California.

Host.—*Rosa* sp. Reared from "prairie rose" in Colorado and Illinois by H. H. Ross.

Biology.—Larvae were collected from prairie rose by Ross at Green Mountain, Colo., on July 31, 1943, and adults emerged during the summer of 1944. Larvae were collected from the same host at Amboy, Ill., on July 12, 1945, and adults emerged May 27, 1946. There is apparently a single generation a year. Other hosts mentioned on labels are "*Quercus gambelii*," "from galls of *Rhodites arefactus* on wild rose," "from *Sambucus* pith," and "from old oak post." These are probably overwintering and pupation sites for the larva and do not represent the true host plant.

Discussion.—This species may be recognized by characters given in the generic description. The color, especially that of the abdomen, is extremely variable, and each color form may be found in nearby localities.

Tribe ALLANTINI

Genus ALLANTUS Panzer

Allantus Panzer, 1801, pl. 12; Rohwer, 1911a, p. 407; Enslin, 1914, p. 221; Malaise, 1934, p. 457; Conde, 1935b, p. 231; Ross, 1937a, p. 91; Ross, 1937b, p. 92; Ross, 1951, p. 58; Benson, 1952, p. 92; Takeuchi, 1952, p. 40; Lorenz and Kraus, 1957, p. 101; Wong, 1966, p. 852.

Type-species: *Tenthredo togata* Panzer. Monotypic.

Emphytus Klug 1818, p. 273; Dalla Torre, 1894, p. 113; Konow, 1905, p. 104; Rohwer, 1911c, p. 219 (= *Allantus* Panzer); MacGillivray, 1916, p. 55; Malaise, 1945, p. 77.

Type-species: *Tenthredo cincta* Linnaeus. Designated by Curtis, 1833.

Emphytus subgenus *Synemphytus* Malaise, 1947, p. 5; Takeuchi, 1952, p. 40 (= *Allantus* Panzer).

Type-species: *Tenthredo togatus* Panzer. Original designation.

Adult.—Antenna filiform, second segment as long as broad, third segment subequal in length to fourth segment, apical four segments reduced in length as compared to fourth and fifth segments (pl. XVII, 219). Clypeus deeply, circularly incised for about half its medial length, sometimes transversely ridged near anterior margin (pl. XVII, 216–218); malar space less than diameter of front ocellus; genal carina present, extending to top of eye; left mandible bidentate, right mandible unidentate (pl. XVII, 215). Tarsal claw with long inner tooth and acute basal lobe (pl. XVII, 214). Hindbasitarsus subequal in length to or shorter than following tarsal segments together. Forewing with anal crossvein oblique, first free sector of vein *Rs* absent, thus with three cubital

cells; veins *M* and *Rs* + *M* meeting *Sc* + *R* at same point. Hindwing with cells *Rs* and *M* both absent; anal cell with short petiole, shorter than width of cell. Hindwing of male without peripheral vein.

Larva.—Setae and small tubercles present on annulets 1, 2, and 4 of each abdominal segment 1 to 9 (pl. XIX, 237). Otherwise similar to larvae of *Empria*.

Discussion.—*Allantus* is a rather large genus of about 35 species, most of which are found in Europe and Asia. Three of the seven North American species are also found in Eurasia. The asymmetrical mandibles, deeply emarginated clypeus, absence of the first free sector of vein *Rs* in the forewing, and absence of cell *M* in the hindwing will separate members of this genus. With the exception of *A. viennensis*, which has several yellow bands on the abdomen in both sexes, the North American females have a narrow white band on the abdomen, but the abdomen of all males is entirely black. The larvae are not well known in North America and only the larva of *cinctus* is described. They are similar to the larvae of *Empria*, but have tubercles in addition to setae on annulet 1. All other known North American Allantinae lack ornamentation on the first annulet of the abdominal segments.

Since Ross' revision (1937a), three species have been added to the North American fauna.

There has been confusion in some literature regarding the interpretation of the genus name *Allantus*. Jurine (1801, May) first used *Allantus* with *Tenthredo scrophulariae* Linnaeus (a species of *Tenthredo*). However, with the suppression of the Erlangen list (Jurine, 1801) by the International Commission of Zoological Nomenclature, *Allantus* first appeared in Panzer (1801, Sept.) in association with *togata*. Therefore, *Allantus* was first proposed by Panzer (1801), with only one species, *Tenthredo togata*, which he described as new. Rohwer (1911c) recognized this, and most authors since Rohwer have used *Allantus* with *togata* as its type-species. Prior to Rohwer, *Allantus* was used as a genus near *Tenthredo* in the Tenthredininae or considered a synonym of it, and *Emphytus* Klug was used for this group of species. Malaise (1945) rejected Rohwer's decision and returned to the old usage of *Allantus* because he believed Panzer (1801) only doubtfully referred *togata* to *Allantus* but accepted positively in 1805 (Panzer, 1805) that *Allantus* included the species *Tenthredo lateralis* Fabricius. This would mean that these names would be applied as they were before Rohwer (1911c), that is *Allantus* would be in the subfamily Tenthredininae and *Emphytus* would be applied to the group of species treated here. I see no reason not to accept *Allan-*

tus as most authors have done since Rohwer (1911c), because Panzer (1801) definitely associated *togata* with *Allantus* and it is the only species included with *Allantus*.

Key to *Allantus* Species

Adults

1. Abdominal tergites 1, 4, 5, and 7 to 10 with complete or partial yellow bands; forewings hyaline with contrasting infuscated area on anteroapical portion ----- *A. viennensis* (Schrank)
Abdomen black or with only tergite 5 whitish; wings uniformly hyaline or lightly infuscated ----- 2
2. Hindfemur rufous or with basal half black and apical half rufous-- 3
Hindfemur entirely black ----- 5
3. Labrum white ----- *A. albolabris* (Rohwer)
Labrum brown or black ----- 4
4. Hindfemur entirely rufous; tegulae white ----- *A. mellipes* (Norton)
Hindfemur with basal half black, apical half rufous; tegulae black ----- *A. rahmus*, n. sp.
5. Serrulae of lancet narrow and truncated at apices (pl. XVII, 221) [male known only for *cinctus*] ----- 6
Serrulae of lancet broad and rounded (pl. XVIII, 224) [male unknown] ----- 7
6. Hindtibia reddish brown to orange ----- *A. cinctus* (Linnaeus)
Hindtibia black with basal quarter white ----- *A. nigritibialis* Rohwer
7. Ridge present in center of clypeus (pl. XVII, 217); apical segments of hindtarsus same color as apex of hindtibia, which is black; without small ridge on posterior margin of mesoscutellum; lancet somewhat shorter than that of *umbonatus* (pl. XVII, 220) ----- *A. basalis* (Klug)
Ridge absent in center of clypeus (pl. XVII, 216); apical segments of hindtarsus usually not same color as apex of hindtibia; small ridge present on posterior margin of mesoscutellum; lancet longer than that of *basalis* (pl. XVIII, 224) ----- *A. umbonatus* Wong

Descriptions of *Allantus* Species

Allantus albolabris (Rohwer)

Emphytus mellipes var. *albolabris* Rohwer, 1917, p. 152.

Allantus albolabris: Ross, 1937a, p. 92; Ross, 1951, p. 59.

Emphytus gemitus MacGillivray, 1923e, p. 163; Ross, 1937a, p. 92 (= *albolabris* Rohwer).

Female.—Length, 7.5 to 7.9 mm. Head black; small white spot on each upper inner orbit; supraclypeal area sometimes with white spot; labrum white; maxillary and labial palpi whitish to brown. Thorax black; tegulae white. Legs orange with base of each coxa black and apex of each tarsus infuscated. Abdomen black with fifth segment mostly white; extreme posterior margin of other

segments sometimes whitish; sheath black. Wings hyaline; costa and subcosta brownish, stigma brownish with base white, remaining veins black.

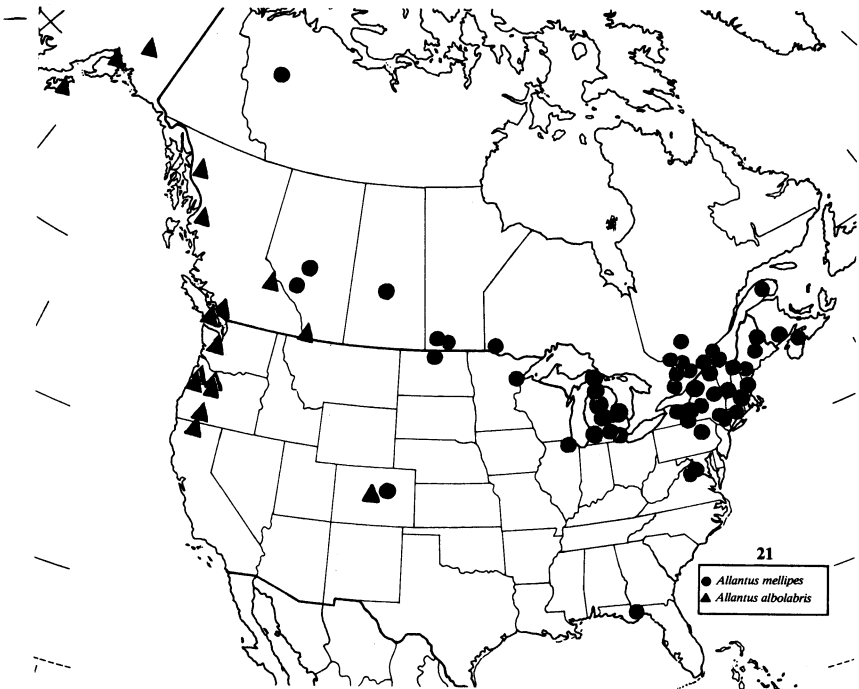
Clypeus circularly emarginated, without ridge. Head and body mostly smooth and shining, roughened to shagreened only on upper portion of mesepisternum and posterior half of mesoscutellum. Sheath straight above, rounded below and at apex. Lancet with about 19 serrulae, each serrula low, rounded, with 1 anterior and no posterior subbasal teeth (as in pl. XVIII, 222).

Male.—Length, 7.5 mm. Coloration and structure similar to those of female except abdomen, which is black. Genitalia similar to those of *mellipes*, plate XVIII, 228, 229.

Larva.—Unknown.

Holotypes.—*E. albolabris* Rohwer: At the U.S. National Museum, type No. 18212, ♀, labeled "Departure Bay, Vanc. I., 5-VII-'13, E. M. Walker." *E. gemitus* MacGillivray: At the Illinois Natural History Survey, ♀, "Kodiak, Alaska, June 10-17," "Jas. S. Hine, collector."

Distribution.—Western North America from Alaska to Colorado and Oregon (fig. 21): Colorado, Alberta, Alaska, British Columbia, Washington, Oregon, California.



Host.—Unknown.

Biology.—Unknown. Adults have been collected in May, June, July, and August.

Discussion.—Structurally this species is similar to *mellipes*. The coloration is also the same as for *mellipes* except the white labrum in *albolabris*, a character that is constant for all specimens collected in the West. Until more is known about this species, it is treated as distinct.

Allantus basalis (Klug)

Tenthredo (*Emphytus*) *basalis* Klug, 1818, p. 282.

Emphytus basalis: Dalla Torre, 1894, p. 113, gives references to this species in European literature prior to 1894; Konow, 1905, p. 105; Malaise, 1931b, p. 141; Malaise, 1932, p. 23; Conde, 1935a, p. 77; Takeuchi, 1936, p. 91; Hardouin, 1943, p. 172; Benson, 1945, p. 101; Berland, 1947, p. 224; Hellén, 1948, p. 43.

Allantus basalis: Enslin, 1914, p. 228; Rohwer, 1925, p. 4; Stein, 1929, p. 113; Ross, 1937a, p. 91; Ross, 1951, p. 59; Benson, 1952, p. 94; Lorenz and Kraus, 1957, p. 106; Wong, 1966, p. 852; Verzhutskii, 1966, p. 76.

Female.—Length, 7.6 to 7.9 mm. Antenna and head black; small white spot on each upper inner orbit; labrum, maxillary and labial palpi brownish. Thorax black; tegulae white. Legs mostly black with following white: Extreme apex of each coxa, each trochanter entirely, outer surface of foretibia, base of midtibia and hindtibia, and outer surface of foretarsus. Abdomen black with mesial portion of basal plates and most of fifth tergum white. Wings hyaline; veins and stigma mostly brownish to black with apex of costa, apex of subcosta, and extreme base of stigma whitish.

Clypeus circularly emarginated with small ridge along entire anterior margin (pl. XVII, 217). Head and body mostly shining with clypeus, mesepisternum, pronotum, and mesoscutellum roughened and shagreened. Mesoscutellum without small ridge on posterior margin. Sheath straight above, rounded below and at apex. Lancet with about 20 serrulae, each serrula low, rounded, with 1 anterior and several fine, indistinct, posterior subbasal teeth (pl. XVII, 220); lancet somewhat short and broad, shorter than midtibia.

Male.—Not known in North America. According to Benson (1952), similar to the female.

Larva.—Not examined and only briefly described by Stein (1929) and Lorenz and Kraus (1957). The latter authors could not separate the larva from that of *cinctus*.

Holotype.—Klug's type is in the Zoological Museum of Berlin.

Distribution.—Europe to Siberia and Japan; eastern North America (fig. 22): Newfoundland (insular), Nova Scotia, New York, Michigan, Tennessee.

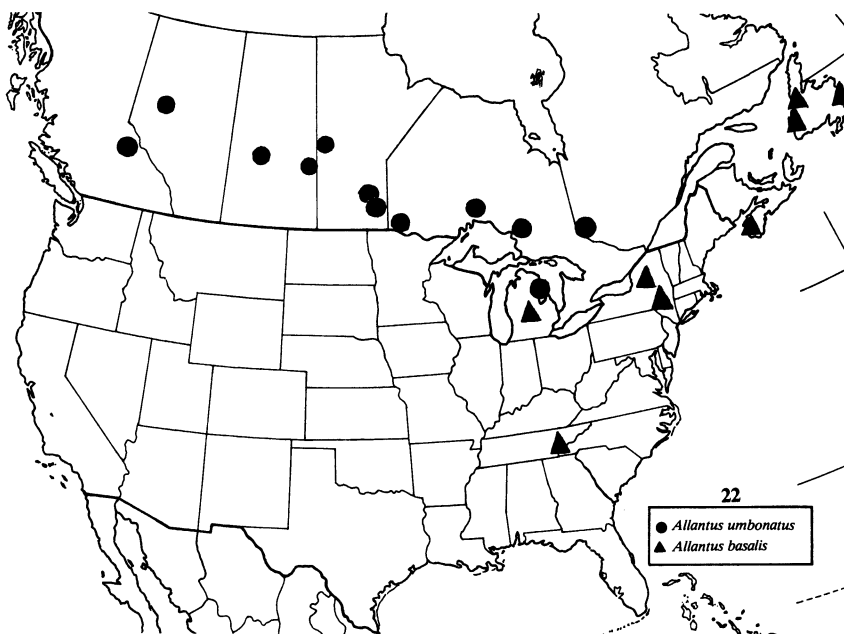
Host.—In Europe, *Rosa* sp. (Benson, 1952). Verzhutskii (1966) recorded it as being a pest of *Betula* in the Baikal region of Siberia.

Biology.—Unknown in North America. Adults have been collected in June and July. See Verzhutskii (1966) for biological notes in Siberia.

Discussion.—The black hindfemur, mostly black hindtibia, and rounded serrulae of the lancet will separate this species. Its distinction from *umbonatus* is not as clear-cut, but the combination of characters as given in the preceding key to species should be adequate.

Typically this species has the hindtibia and hindtarsus black with only the extreme bases of the hindtibia and hindbasitarsus white. A color form having the apices of the hindtibia and the tarsus brown instead of black is found in Scotland and Scandinavia and was named subspecies *caledonicus* by Benson. This lighter color form has not been found in North America.

Rohwer (1911a) described *nigritibialis* and later (1925) synonymized it under *basalis*. The coloration of the two is identical, but they are different species (see discussion under *nigritibialis*).



I have compared specimens of *basalis* from Europe with those collected in North America and found them to be identical; it may be adventive in North America. The earliest record I saw was July 13, 1905, from Old Forge, N.Y.

Allantus cinctus (Linnaeus)

Tenthredo cinctus Linnaeus, 1758, p. 557; Malaise and Benson, 1934, p. 8.

Emphytus cinctus: Jack, 1889a, p. 279; Dalla Torre, 1894, p. 115, gives references to this species in European literature prior to 1894; Konow, 1905, p. 105; Britton, 1916, p. 185; Conde, 1927, p. 77; Forsius, 1929, p. 3; Malaise, 1932, p. 24; Koornneef, 1933, p. 111; Beffa, 1934, p. 579; Servadei, 1936, p. 97; Miles, 1936b, p. 467; Britton and Zappe, 1937, p. 323; Dicker, 1939, p. 131; Martelli, 1941, p. 171; Hardouin, 1943, p. 46; Benson, 1945, p. 102; Berland, 1947, p. 225; Bernard, 1954, p. 19.

Allantus cinctus: Enslin, 1914, p. 230; Ross, 1937a, p. 91; Ross, 1951, p. 59; Benson, 1952, p. 94; Maxwell, 1955, p. 80; Lorenz and Kraus, 1957, p. 106; MacNay, 1958, p. 141; Judd, 1962, p. 965; Wong, 1966, p. 852; Verzhutskii, 1966, p. 77; Scheibelreiter, 1973, p. 241.

Emphytus cinctipes Norton, 1867, p. 229; Provancher, 1878, p. 67; Provancher, 1883, p. 193; Dalla Torre, 1894, p. 114; Dyar, 1894, p. 186; Dyar, 1895b, p. 340; Konow, 1905, p. 105; MacGillivray, 1916, p. 57; Middleton, 1922a, p. 12; Will, 1933, p. 30; Ross, 1937a, p. 91 (= *cinctus* Linnaeus); Schuh and Mote, 1948, p. 125.

Female.—Length, 8.0 to 8.5 mm. Antenna and head black; small white spot on each upper inner orbit; maxillary and labial palpi brownish. Thorax black; anterior half of tegulae white. Legs mostly orange with following parts black: Each coxa except extreme apex of hindcoxa, foretrochanter, first segment of midtrochanter, and all of each femur. Abdomen black; mesial portion of basal plates and most of fifth tergum white. Wings hyaline; costa brownish, stigma brownish, apex of costa and subcosta and base of stigma white, remaining veins black.

Clypeus circularly emarginated, with transverse anterior ridge (pl. XVII, 218). Head and body mostly shining with pronotum, mesepisternum, and mesoscutellum dull. Sheath straight above, rounded below and at apex. Each serrula of lancet narrow, truncated at apex, rectangular, with one anterior subbasal tooth and no posterior subbasal teeth (pl. XVII, 221).

Male.—Length, 6.4 to 6.7 mm. Coloration similar to that of female except abdomen, which is all black and ventral surface of apical antennal segments, which is brownish. Parapenis of genitalia extended into long narrow lobe; penis valve oblong, obliquely truncated at apex (pl. XVIII, 226, 227).

Larva.—Late instar, 13 to 21 mm long. Head mostly dark brown above and behind eyes, amber on frons and below eyes;

sometimes with only dark-brown spot on vertex; eyespot and apex of each mandible black. Body grayish on dorsum and extending laterally to spiracles, pale green below spiracles and on venter.

Head with moderately abundant short hairs. Clypeus with 4 setae; labrum emarginated with 8, sometimes 6, setae; epipharynx with arcuate row of 12 to 15 spines on each half (pl. XIX, 235). Left mandible with three ventral and three dorsal teeth, two inner ventral teeth truncate, inner dorsal tooth broad and truncate, and elevated mesial ridge connecting outer dorsal tooth and inner ventral tooth; right mandible with two ventral teeth, inner tooth concave, and two dorsal teeth, inner tooth broad and truncate, mesial ridge present with four or five small teeth at base; each mandible with one seta on outer surface (pl. XIX, 233, 234). Maxillary palpus 4-segmented; 1 seta on second segment; palpifer with 4 setae, stipes with 1 seta; lacinia with row of about 15 spines (pl. XIX, 236). Labial palpus three-segmented, one seta on second segment; submentum with eight setae.

Thorax with small tubercles as for abdomen. Thoracic legs normal, five-segmented, femur longer than trochanter. Abdominal segments 1 to 9 each six-annulate; annulet 1 with one or two tubercles and setae on each side; annulets 2 and 4 each with three tubercles and setae on each side; second postspiracular lobe, subspiracular lobe, and surpedal lobe each with one tubercle and several setae (pl. XIX, 237). Tenth tergum with several tubercles and setae; numerous setae on suranal and subanal areas.

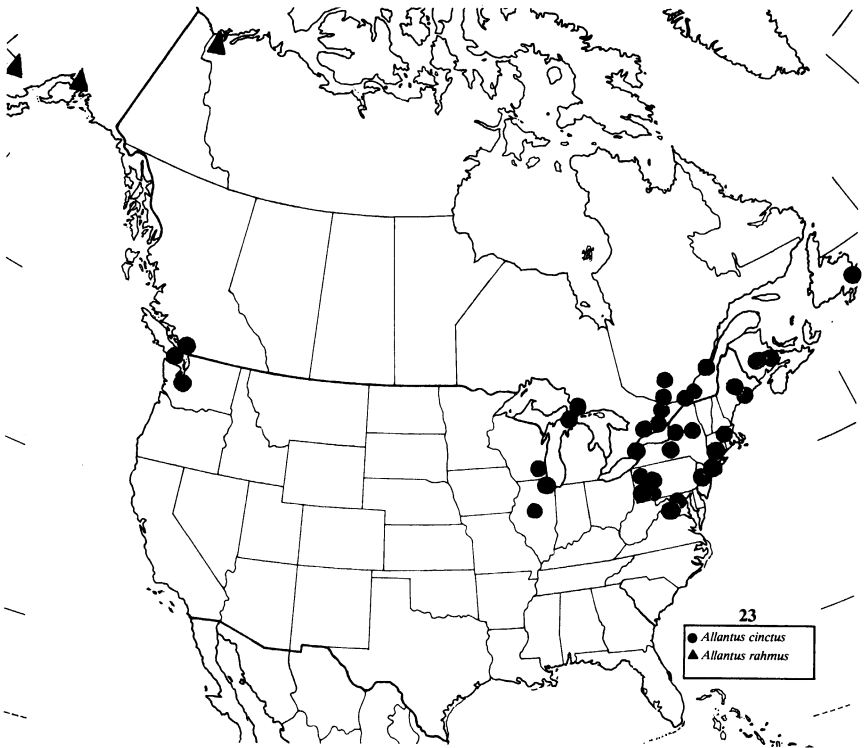
A description of the larva was given by Lorenz and Kraus (1957), and the internal larval anatomy was described by Maxwell (1955).

Holotypes.—The type of *T. cinctus* Linnaeus is in the collection of the Linnean Society of London, a female (Malaise and Benson, 1934). I could not locate the type of *E. cinctipes* Norton.

Distribution.—Europe to Siberia; northeastern United States, southeastern Canada, British Columbia, and Washington (fig. 23): Newfoundland (insular), New Brunswick, Quebec, Maine, Massachusetts, Connecticut, Ontario, New York, New Jersey, Pennsylvania, Maryland, Virginia, Michigan, Wisconsin, Illinois, British Columbia, Washington.

Hosts.—*Rosa* spp., *Fragaria* sp. Most commonly a pest of cultivated roses. In Europe, also recorded from *Rubus* by Lorenz and Kraus (1957).

Biology.—Middleton (1922a) termed this species the "coiled roseworm" and gave some notes on its biology. Adults emerge early in the spring and oviposit on the upper surface of a leaflet, usually near the center. The larva feeds on the undersurface of



the leaflet and when mature searches for some soft wood or other material in which to make a pupal cell. A favorite place for pupation is the pruned ends of the rose shoots, where the mature larva may easily bore into the pith; consequently, it is frequently transported, unnoticed, to different parts of the world. In its southern range there are two generations a year. Middleton (1922a) compared the biology of the three most common sawfly pests of roses; the others are *Endelomyia aethiops* (Fabricius) and *Cladius difformis* (Panzer) (= *isomerus* Norton).

Discussion.—This species is recognized by the black hindfemur, orange hindtibia, and the narrow truncated serrulae of the lancet. Because the larvae commonly go into the pith of their hosts to form a pupal cell, this species may unknowingly be transported and may have been an early import onto this continent, at least prior to 1867. It is still occasionally intercepted in quarantine on rose stock from Europe.

The current approved common name is the curled rose sawfly.

The following names are considered synonymous with *cinctus* in European literature (Enslein, 1914; Berland, 1947): *Tenthredo*

cordigera Geoffrey, *Dolerus varipes* Lepeletier, *T. togata* Zetterstedt, *D. cingulatus* Blanchard, and *Emphytus neglectus* Brischke.

Allantus mellipes (Norton)

Emphytus mellipes Norton, 1861, p. 155; Norton, 1867, p. 228; Provancher, 1878, p. 67; Provancher, 1883, p. 193; Dalla Torre, 1894, p. 119; Konow, 1905, p. 106; MacGillivray, 1916, p. 57.

Allantus mellipes: Ross, 1937a, p. 92; Ross, 1951, p. 59.

Emphytus gillettei MacGillivray, 1902, p. 113; Johnson, 1902, p. 113; MacGillivray, 1904, p. 285; Rohwer, 1908b, p. 178; MacGillivray, 1916, p. 57; Ross, 1937a, p. 92 (= *mellipes* Norton).

Female.—Length, 7.6 to 7.9 mm. Antenna and head black; small brownish spot on each upper inner orbit; maxillary and labial palpi brownish. Thorax black with tegulae white. Legs orange with base of each coxa black, apex of each tarsus infuscated, and each trochanter whitish. Abdomen black with mesial portion of basal plates and fifth segment white; posterior margin of other segments sometimes white. Wings hyaline; costa, subcosta, and base of stigma whitish, rest of stigma and other veins black.

Clypeus circularly emarginated with slight ridge on anterior margin. Head and body mostly smooth and shining with clypeus, pronotum, mesepisternum, and posterior half of mesoscutellum roughened and shagreened. Sheath straight above, rounded below and at apex. Lancet with about 21 serrulae, each serrula rounded, with 1 anterior and no distinct posterior subbasal teeth (pl. XVIII, 222).

Male.—Length, 6.6 to 6.9 mm. Coloration and structure similar to those of female except abdomen, which is entirely black and ventral surface of antenna, which is sometimes brownish. Parapenis of genitalia with rounded projecting lobes; penis valve nearly triangular, apex truncate (pl. XVIII, 228, 229).

Larva.—Unknown.

Holotypes.—*E. mellipes* Norton: At the Museum of Comparative Zoology, Harvard University, ♀, "122 N.N.," "MCZ type 26317." *E. gillettei* MacGillivray: At the Illinois Natural History Survey, ♀, "Colo. 0-0-02," "Denver, Col., V-30-02."

Distribution.—Eastern North America west to the Rockies (fig. 21): Nova Scotia, New Brunswick, Quebec, Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Ontario, New York, Pennsylvania, Virginia, Florida, Michigan, Illinois, Manitoba, Minnesota, North Dakota, Northwest Territories, Saskatchewan, Alberta, Colorado.

Host.—*Fragaria* sp.

Biology.—Johnson (1902) recorded this as being a pest of strawberry in Colorado. Adults appear the last part of May and early June and eggs are inserted from the upper surface of the leaf. There is one brood a year. Other host data from specimens examined undoubtedly refer to pupation sites: In abandoned galleries of *Xylotrechus* in swamp maple; currant; and from burrows of *Pissodes strobi* in white pine.

Discussion.—The orange legs and black labrum will separate this species from others of this genus.

Allantus nigritibialis Rohwer, new status

Allantus cinctus nigritibialis Rohwer, 1911a, p. 407; Rohwer, 1925, p. 4 (= *basalis* Klug).

Female.—Length, 8.0 to 8.4 mm. Antenna and head black; small brownish spot on each upper inner orbit; maxillary and labial palpi whitish. Thorax black; anterior half of tegulae white. Legs black with following white: Apical third of hindcoxa, hindtrochanter entirely, second segment of foretrochanter and midtrochanter, extreme apex of forefemur, outer surface of foretibia and midtibia, and basal quarter of hindtibia; foretarsus and midtarsus infuscated; hindtarsus black with narrow brownish to white band at base of basitarsus and at apex of each segment. Abdomen black with white band on fifth tergum and sometimes white on mesial area of basal plates and laterally on sixth tergum. Wings hyaline; costa and stigma brownish, apex of costa and subcosta and base of stigma white, remaining veins black.

Clypeus circularly emarginated, with indistinct transverse ridge. Head and body mostly shining, with pronotum, mesepisternum, and mesoscutellum finely punctate and dulled. Sheath straight above, rounded below and at apex. Each serrula of lancet narrow, truncated at apex, rectangular, with one anterior subbasal tooth and no posterior subbasal teeth (similar to pl. XVII, 221).

Male.—Unknown.

Larva.—Unknown.

Holotype.—At the U.S. National Museum, type No. 13980, ♀, with the following data: "Rutherford, N.J., 4-15-11, J. B. Smith," "crawling on hemlocks from Japan."

Distribution.—East Asia; eastern United States. NEW JERSEY: Data as for type specimen. VIRGINIA: Falls Church, on rose, May 20, 1972, J. L. Smith (1 ♀). I have also seen the following specimens: U.S.S.R.: Kongaus, Siberia, August 1923, Cockerell. CHINA: H. Kong, Koebele (1 ♀ paratype); Suifu,

Szechwan, D. C. Graham; Suifu, Sz., Oct. 10-16, 1930, D. C. Graham; Soochow, N. Gist Gee.

Host.—The adult from Virginia was collected from rose.

Biology.—Unknown.

Discussion.—Whether this is an adventive or even a valid species is open to question. According to the data on Rohwer's type specimen, it appears to be a quarantine interception from Japan, and this is supported by the additional records of this form from East Asia. However, in 1972, my wife found a specimen on our rose bushes that I assumed was the common *cinctus*, but, much to my surprise on closer examination of the specimen, it was identical to *nigritibialis*. Unfortunately I did not discover this until the next winter, and I have not been able to find specimens since. This may be an adventive species. I have searched the literature for other available names since it may have been previously described from Asia but to no avail.

Although *nigritibialis* is extremely close to *cinctus*, differing only by the black and white femora and tarsi, I believe it is best to treat it separately until more information is available. It is possibly only a color form of *cinctus*.

Because of the similar coloration of *nigritibialis* and *basalis*, Rohwer (1925) synonymized the former with the latter, and Ross (1937a, 1951) followed this synonymy. The serrulae of the lancet of *basalis* are broadly rounded, however, in contrast to the truncated serrulae of *cinctus* and *nigritibialis*; consequently, the last two must be much more closely related.

Allantus rahmus, new species

Female.—Length, 7.3 mm. Antenna black, apical segments brownish. Head black, small spot on each upper inner orbit and maxillary and labial palpi brownish. Thorax black. Legs with each coxa, each trochanter, and basal half of each femur black, apical half of each femur and all of each tibia entirely orange yellow, each tarsus orange yellow with apical segments blackish. Abdomen black, fifth tergite mostly whitish. Wings hyaline; stigma and veins black, apex of costa near stigma whitish.

Clypeus circularly emarginated, without distinct anterior ridge. Malar space a little greater than diameter of front ocellus. Head and body mostly shining with clypeus, pronotum, mesepisternum, mesepimeron, and mesoscutellum roughened and dull; pectus dull to moderately shining. Sheath straight above, rounded below, tapering to rather acutely rounded apex. Lancet shorter than midtibia, with about 16 serrulae, each serrula low, roundly pointed

at apex, with 1 anterior and no posterior subbasal teeth (pl. XVIII, 223); lance serrate dorsally at apex.

Male.—Length 7.1 mm. Color similar to that of female except abdomen and hindbasitarsus, which are black. Structure similar to that of female, but generally the surface texture of the head and thorax is more dull and only moderately shining. Harpe and parapenis similar to those of *mellipes* (pl. XVIII, 228); penis valve more slender and flatter at apex than that of *mellipes* (pl. XVIII, 230).

Larva.—Unknown.

Holotype.—Female, King Salmon, Naknek R., Alaska, 11-VII-1952, J. B. Hartley. In the Canadian National Collection, Ottawa.

Paratypes.—NORTHWEST TERRITORIES: Aklavik, 26-VI-1956, R. E. Leech (1 ♂). ALASKA: Matanuska, June 9, 1945, rotary trap coll., J. C. Chamberlin (1 ♂). In the Canadian National Collection and U.S. National Museum.

Distribution.—Northwest Territories and Alaska (fig. 23).

Host.—Unknown.

Biology.—Unknown.

Discussion.—The color and genitalia will separate this species. The hindfemur, which is black basally and orange apically, and black tegula will separate it from most species. The female lancet has fewer serrulae than in other species, and the serrulae are more pointed and asymmetrical as compared with the more evenly rounded and symmetrical serrulae of *mellipes*, *albolabris*, *basalis*, and *umbonatus*. The general texture of the head and body is duller and more roughened than that of other species of *Allantus*.

Being a northern species, this might be a Holarctic form already described from the Palaearctic region; however, I was unable to find any applicable names.

The species name is an arbitrary combination of letters and is to be treated as a noun.

Allantus umbonatus Wong

Allantus umbonatus Wong, 1966, p. 852.

Female.—Length, 8.0 mm. Antenna and head black with labrum and most of maxillary and labial palpi whitish. Thorax black with tegulae white. Legs with apex of each coxa, each trochanter, and basal portion of each femur and tibia yellowish white; apical portion of each femur, apical two-thirds of each tibia and each tarsus except infuscated apical segments reddish brown or piceous. Abdomen black with mesial portion of basal plates and fifth segment on at least anterior half white. Wings hyaline; veins mostly black,

costa paler, apex of costa and subcosta and base of stigma whitish, rest of stigma black.

Clypeus circularly incised, slight ridge on anterolateral margins but absent in center (pl. XVII, 216). Head and body mostly smooth and shining with clypeus, mesepisternum, and posterior half of mesoscutellum roughened and dull; mesoscutellum with small, narrow, shining caudal ridge. Sheath straight above and below, rounded at apex. Lancet rather long and slender, longer than midtibia, with about 21 serrulae, each serrula low, rounded, with 1 anterior and no distinct posterior subbasal teeth (pl. XVIII, 224).

Male.—Unknown.

Larva.—Unknown.

Holotype.—In the Canadian National Collection, ♀, "Faust, Alberta, Forest Insect Survey No. 50A 2029b, *Betula papyrifera* Marsh.," "CNC type No. 9136."

Distribution.—Nearly transcontinental in Canada; Michigan (fig. 22): Quebec, Ontario, Michigan, Manitoba, Saskatchewan, Alberta, British Columbia.

Host.—*Betula papyrifera* Marsh.

Biology.—According to Wong (1966), larvae were collected from early August to early September, feeding was completed by the middle of September, and they entered the ground to overwinter. Adults were observed in the field in July.

Discussion.—This species may be separated from others by the mostly black hindfemur and rounded serrulae of the lancet. In this respect, it is similar to *basalis*, but *umbonatus* has no ridge in the center of the clypeus, the mesoscutellum has a small shiny caudal ridge, the apex of the hindtarsus is usually not the same color as the apex of the hindtibia, and the lancet is relatively longer, exceeding the length of the midtibia.

Allantus viennensis (Schrank)

Tenthredo viennensis Schrank, 1781, p. 331.

Emphytus viennensis: André, 1879, p. 254; Brischke and Zaddach, 1883, p. 249; Dalla Torre, 1894, p. 124 (gives other references to this species prior to 1894); Konow, 1905, p. 107; Stritt, 1935, p. 184; Hardouin, 1943, p. 171; Berland, 1947, p. 221.

Allantus viennensis: Enslin, 1914, p. 223; Stein, 1929, p. 121; Crevecoeur and Maréchal, 1938, p. 481; Lorenz and Kraus, 1957, p. 103; Kartasheva, 1964, p. 41; Benson, 1968, p. 147; Scheibelreiter, 1973, p. 243; Smith, 1975a, p. 163–165.

Female.—Length, 8.0 to 10.0 mm. Antenna black with first two segments except lower surface of first segment yellow and third and basal half of fourth segment reddish brown. Head black with

center of labrum, broad transverse stripe on clypeus, narrow line on inner margin of eyes and sometimes on outer margins, and two spots on vertex, one of each side of postocellar area yellow. Thorax black with tegulae and spot behind each cenchrus yellow. Legs yellow with coxae and femora except extreme apices black; tarsi sometimes infuscated and sometimes extreme apex of hind-tibia brownish. Abdomen black with basal plates and posterior bands on segments 4, 5, 7, 8, and 9, also sometimes 6 yellow; yellow bands on segments 4, 5, 8, and 9 usually broadest. Forewing hyaline with infuscated spot on anteroapical margin, covering radial cell, first cubital cell, and extending slightly beyond; hindwing hyaline; veins brownish with costa and stigma brownish yellow.

Clypeus circularly emarginated for about one-third its medial length and strongly convex in profile. Antenna stout, less than $1\frac{1}{2}$ times head width; apical four segments subserrate; apical five segments less than two times longer than broad. Head and body smooth and shining; posterior half of mesoscutellum with few punctures; abdomen with fine microsculpture. Sheath straight above, rounded below and at apex. Lancet with about 23 serrulae; each serrula rounded with indistinct subbasal teeth (pl. XVIII, 225).

Male.—Length, 7.5 to 9.0 mm. Coloration similar to that of female except following: Antenna black, sometimes yellow spot on first or first and second segments; paraptera sometimes yellow; only abdominal segments 4, 5, and 8 with posterior yellow bands and sometimes lateral and ventral areas of third segment. Structure similar to that of female. Genitalia as in plate XIX, 231, 232.

Larva.—Not examined, but described by André (1879), Brischke and Zaddach (1883), Stein (1929), and Lorenz and Kraus (1957). According to Lorenz and Kraus, the head is entirely yellow, without black spots as in *cinctus*, the clypeus is pale, and the 10th abdominal tergum lacks protuberances.

Holotype.—Location not known. The interpretation of *viennensis* is based on the traditional usage of the name.

Distribution.—Central and southern Europe, at least as far north as Belgium, Germany, and Austria, south to the Mediterranean, and west to Kirgiz, S.S.R. I have seen the following from North America: NEW YORK: Tompkins Co., J. Nowakowski col., 13-VI-67, *Rubus* sp. (1 ♀, 2 ♂♂); same data, 15-VI-67, *Rosa* sp. (2 ♀♀, 1 ♂); Ludlowville [Tompkins Co.], 6 June 1968, L. L. Pechuman (1 ♂); Ludlowville, 17 August 1968, Malaise trap, L. L. Pechuman (1 ♂).

Hosts.—*Rosa canina* L. (Berland, 1947; Stein, 1929); *Rosa*

rugosa Thunb., *R. pendulina* L., *R. rubifolia* R. Br., *R. rubiginosa* L., *R. spinosissima* L., *R. gallica* L. (Scheibelreiter, 1973); wild and cultivated rose, raspberry, blackberry, and *Ribes* (Kartasheva, 1964).

Biology.—The specimens from New York were swept from flowers of *Rosa* and *Rubus* and collected in Malaise traps where these plants exist nearby. Scheibelreiter (1973) reported on its biology in Europe. In Austria, it may have three generations a year, even though Lorenz and Kraus (1957) stated there is one generation. The larvae feed on the foliage of the host and overwinter in the twigs of the host or in the soil.

Discussion.—I was surprised to find specimens of this European species at Cornell University collected in Tompkins County, N.Y. The earliest collection dates are 1967, indicating a rather recent introduction onto this continent. Such a distinctive species in coloration would certainly have been noticed if specimens had been collected earlier.

The coloration and infuscated spot on the anteroapical margins of the forewings will separate *viennensis* from other *Allantus* species in North America; in fact, the coloration should distinguish it from most all other sawflies known in North America. No other species of *Allantus* treated in this bulletin has more than one pale band on the abdomen, and in all other species the wings are uniformly hyaline or very lightly, uniformly infuscated.

Varieties of this species have been described in Europe and are given by Berland (1947) and Enslin (1914). These are *Emphytus succinctus* var. *steini* Schmiedeknecht, 1881; *E. viennensis* var. *nigricoxis* De Stefani, 1883; *E. viennensis* var. *medinae* Konow, 1894; and *Allantus viennensis* var. *uberius* Enslin, 1914. Most of these vary from the typical form by having most or all of the antennae reddish, amount of yellow on the head, and variation in size and number of the yellow bands on the abdomen.

Genus MACREMPHYTUS MacGillivray

Macremphytus MacGillivray, 1908, p. 368; MacGillivray, 1916, p. 59; Yuasa, 1922, p. 51; Ross, 1937b, p. 93; Ross, 1951, p. 59.

Type-species: *Harpiphorus varianus* Norton. Original designation.

Adult.—Antenna long, laterally compressed, each segment slightly expanded at its apex; second segment as broad or broader than long; third segment subequal to or slightly longer than fourth segment; segments beyond third gradually decreasing in length (pl. XIX, 242). Clypeus deeply, circularly incised for half or more of its medial length and with ridge on anterior margin (pl. XIX,

238); malar space as wide as or wider than diameter of front ocellus; genal carina present, extending to top of eye, usually absent behind postocellar area; left mandible bidentate, right mandible simple (pl. XIX, 239). Mesepisternum roughened to punctate. Tarsal claw bifid, with large, acute basal lobe (pl. XIX, 240). Hindbasitarsus longer than remaining hindtarsal segments together (pl. XIX, 241). Forewing with anal crossvein oblique; first free sector of vein *Rs* absent; veins *M* and *Rs* + *M* meeting *Sc* + *R* at same point. Hindwing with cell *Rs* absent, cell *M* present; anal cell petiolate, with very short petiole. Hindwing of male without peripheral vein.

Larva.—Annulets 2 and 4 of abdominal segments 1 to 9 with minute setae and tubercles, first annulet bare. Femur and tibia of thoracic legs each longer than trochanter. Left mandible without teeth on ventral margin, ventral margin only a sharp ridge (pl. XX, 252).

Discussion.—This is a small genus known only from North America; it includes four species. The adults differ from those of *Allantus* by the compressed antennae, presence of cell *M* in the hindwing, and the hindbasitarsus, which is longer than the following tarsal segments combined. From *Taxonus*, the adults are separated by the compressed antennae and absence of the first free sector of vein *Rs* in the forewing. The larva differs from those of *Allantus* by the absence of setae or tubercles on the first annulet of the abdominal segments and from other genera of Allantinae by the straight ventral margin of the left mandible. Prepupae are commonly encountered and sometimes differ in color and structure from the feeding stages. Characters to separate the prepupae and feeding stages are given in the key to larvae.

Species of this genus are associated with *Cornus* and possibly *Viburnum*. So far as is known, they have a single generation a year, and the mature larva commonly bores into wood to form a pupal cell.

Keys to *Macremphytus* Species

Adults

1. Apical antennal segments black.....*M. semicornis* (Say)
 Apical three or four antennal segments white.....2
2. Serrulae of lancet rounded, deep (pl. XX, 244); coloration predominately black, sometimes with abdomen and basal antennal segments dark reddish.....*M. tarsatus* (Say)
 Serrulae of lancet shallow, flat at apices (pl. XX, 245); coloration predominately rufous or reddish brown, and usually with basal antennal segments reddish brown.....3

3. Hindfemur rufous or with basal half rufous and apical half black;
 tegulae white; eastern-----*M. testaceus* (Norton)
 Hindfemur entirely black and/or tegulae rufous; western-----
 -----*M. lovetti* MacGillivray

Larvae

1. Prepupa (left mandible with four teeth, right mandible with three teeth, arranged in linear row on each mandible; head with deep, widely spaced punctures)----- 2
 Feeding stages (each mandible with dorsal and ventral teeth, and each mandible different in structure; head without punctures)--- 3
2. Dorsum of body with rectangular black pattern, each rectangle with center pale (pl. XX, 253)-----*M. tarsatus* (Say)
 Pattern of body consisting of irregular brown spots (pl. XXI, 254)
 -----*M. testaceus* (Norton)
3. Pattern of body consisting of rectangular dark areas as for prepupa (pl. XX, 253)-----*M. tarsatus* (Say)
 Body unicolorous, pale, only apex of 10th tergum with dark-brown spots-----*M. testaceus* (Norton)

Descriptions of *Macremphytus* Species

Macremphytus lovetti MacGillivray

Macremphytus lovetti MacGillivray, 1923b, p. 177; Ross, 1951, p. 59.

Female.—Length, 10.8 to 11.4 mm. Antenna reddish brown with apical four segments white; fourth and fifth segments sometimes black. Head mostly reddish brown with ocellar and postocellar areas and clypeal furrows black; labrum and maxillary and labial palpi whitish. Thorax mostly black with tegulae, mesoprescutum, mesoscutellum, mesial portion of each lateral lobe, and metascutellum reddish brown; mesopleuron and lateral lobes of mesonotum sometimes reddish brown. Legs reddish brown to white with each coxa, basal half of forefemur, midfemur, usually all of hindfemur, and extreme apex of hindtibia black. Abdomen reddish brown. Wings lightly infuscated.

Clypeus with distinct transverse ridge. Each serrula of lancet low, flat, with one anterior and seven or eight posterior subbasal teeth (as in pl. XX, 245).

Male.—Length, 7.4 to 7.5 mm. Antenna black with apical four segments white. Head black with most of orbits and sometimes clypeus reddish brown; labrum and maxillary and labial palpi whitish. Thorax black with tegulae, spot on inner margin of each lateral lobe of mesonotum, all of mesoscutellum and metascutellum reddish brown. Legs orange with each coxa, extreme apex of hindfemur and extreme apex of hindtibia black; hindfemur com-

monly all black. Abdomen orange to reddish brown. Genitalia as in plate XX, 246, 247.

Larva.—Unknown.

Holotype.—At the Illinois Natural History Survey, ♀, "Rock Creek, Ore., 7//14," "A. L. Lovett, collector."

Distribution.—Western North America (fig. 24): Alberta, Montana, British Columbia, Idaho, Oregon.

Host.—Unknown. One adult was collected from creek dogwood.

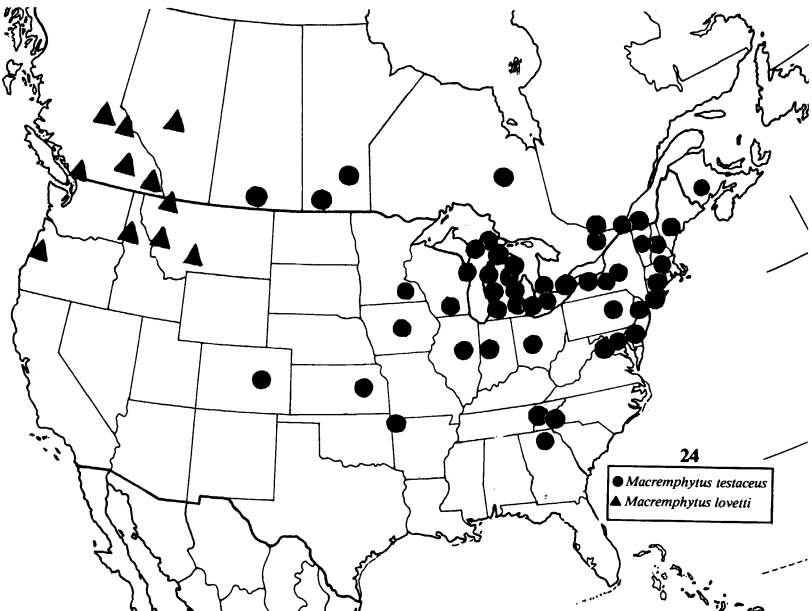
Biology.—Unknown. Information associated with Hopkins' No. 12375 on one specimen is as follows: "Larvae live in dead cottonwood (dry) and willows, making rather long tunnels filled with coarse cuttings." This was undoubtedly a pupation site for the larva.

Discussion.—This species is similar to *testaceus* but differs by the reddish-brown tegula and usually black hindfemur. I prefer to keep *lovetti* distinct until more is known about these western populations.

Macremphytus semicornis (Say)

Emphytus semicornis Say, 1836, p. 220; LeConte, 1859, p. 680; Norton, 1861, p. 157; Norton, 1867, p. 231; Provancher, 1878, p. 69; Provancher, 1883, p. 195; Konow, 1905, p. 106.

Harpiphorus semicornis: Provancher, 1888, p. 348; Dalla Torre, 1894, p. 154.



Macremphytus semicornis: MacGillivray, 1916, p. 61; Ross, 1951, p. 59; Raizenne, 1957, p. 38; Martineau, 1965, p. 46.

Macremphytus bicornis MacGillivray, 1923d, p. 21; Ross, 1951, p. 59 (= *semicornis* Say).

Female.—Length, 8.2 to 8.5 mm. Antenna reddish brown with apical four or five segments black. Head reddish brown with black between ocelli and in antennal furrows; labrum white, maxillary and labial palpi brownish. Thorax mostly reddish brown, usually with pectus, cervical sclerites, lower part of pronotum, and lateral lobes of mesonotum black. Legs light reddish brown to white with base of each coxa, each femur, and apex of midtibia and hindtibia dark brown to black. Abdomen reddish brown. Wings very lightly, uniformly infuscated.

Clypeus with indistinct transverse ridge. Each serrula of lancet low, with three rounded subbasal teeth at apex and two or three rounded posterior subbasal teeth (pl. XIX, 243).

Male.—Length, 6.1 to 6.5 mm. Antenna black with first two segments reddish brown. Head mostly black with orbits and supra-clypeal area reddish brown; labrum white, maxillary and labial palpi brownish. Thorax black with posterior portion of pronotum and all of tegulae reddish brown, mesoscutellum and metascutellum whitish. Coloration of legs and abdomen similar to that of female. Genitalia as in plate XX, 248; parapenis with narrow apical lobe; penis valve oblong, rounded at apex.

Larva.—Unknown.

Holotypes.—*E. semicornis* Say: Probably lost. *M. bicornis* MacGillivray: At the Illinois Natural History Survey, ♀, "Wellesley, Mass., VI-1-17," "A. M. Wilcox, collector."

Distribution.—Eastern North America, west in Canada to British Columbia (fig. 25): Newfoundland (insular), Quebec, Maine, New Hampshire, Massachusetts, Ontario, New York, Michigan, Wisconsin, Manitoba, North Dakota, British Columbia.

Host.—*Cornus* sp. (Martineau, 1965; Raizenne, 1957).

Biology.—In Ontario, adults were found in the spring and larvae in August by Raizenne (1957).

Discussion.—The black apical antennal segments will distinguish this species; all other species of *Macremphytus* have the apical antennal segments white.

Macremphytus tarsatus (Say)

Emphytus tarsatus Say, 1836, p. 220; LeConte, 1859, p. 679; Norton, 1861, p. 157; Norton, 1867, p. 231; Provancher, 1878, p. 68; Provancher, 1883, p. 194; Konow, 1905, p. 106.



Harpiphorus tarsatus: Provancher, 1888, p. 348; Dalla Torre, 1894, p. 154; Dyar, 1897a, p. 21; Dyar, 1900, p. 29.

Macremphytus tarsatus: MacGillivray, 1916, p. 61; Ross, 1951, p. 59.

Emphytus bollii Norton, 1872, p. 80; Cresson, 1880a, p. 38; Konow, 1905, p. 105; Ross, 1951, p. 59 (= *tarsatus* Say).

Harpiphorus bollii: Kirby, 1882, p. 206; Dalla Torre, 1894, p. 153.

Harpiphorus intermedius Dyar, 1900, p. 30. New synonymy.

Macremphytus intermedius: Anonymous, 1939, p. 74; Ross, 1951, p. 59; Raizenne, 1957, p. 37.

Female.—Length, 10.8 to 11.8 mm. Antenna black with apical three or four segments white. Head black; labrum white, maxillary and labial palpi brownish; orbits sometimes brownish. Thorax black with tegulae brownish to white and mesoscutellum and metascutellum sometimes whitish. Legs black with each trochanter, foretibia, and each tarsus whitish; midtibia and base of hindtibia sometimes whitish or brownish. Abdomen black, sometimes brownish at apex and on venter, or mostly red brown. Wings hyaline to very lightly, uniformly infuscated.

Clypeus with distinct transverse ridge near anterior margin. Each serrula of lancet rounded at anterior, apex with one anterior and three or four posterior subbasal teeth (pl. XX, 244).

Male.—Length, 9.7 to 10.5 mm. Coloration and structure similar to those of female. Parapenis of genitalia with narrow apical lobe;

penis valve oblong, rounded at apex, with minute dorsoapical tooth (as in pl. XX, 246, 247).

Larva.—Late feeding stage, 22 to 30 mm long. Head black with clypeus and mouthparts except apex of each mandible white. Each segment of body except prothorax and 10th abdominal segment with transverse rectangular brown area, extending laterally to spiracles, and each brown area with central pale area in center; 10th tergum with large dark-brown spot (as in pl. XX, 253).

Head shining, without pits; hairs moderately abundant. Clypeus with 4 setae; labrum emarginated, asymmetrical, with 6 setae; epipharynx with arcuate row of 9 to 12 spines on each half (pl. XX, 250). Left mandible with flat ventral ridge terminating in single outer tooth, and three dorsal teeth with inner tooth broad and truncate, inner ridge and elevated area present; right mandible with single ventral tooth and long ridge, two dorsal teeth with inner tooth broad and truncate and three mesial ridges with two or three teeth on each ridge; each mandible with one seta on outer surface (pl. XX, 251, 252). Maxillary palpus 4-segmented, second segment with 1 seta, palpifer with 4 setae, stipes with 1 seta, lacinia with row of 8 to 10 spines (pl. XX, 249). Labial palpus three-segmented, one seta on second segment; submentum with six setae.

Thoracic legs normal, five-segmented with trochanter shorter than either femur or tibia. Numerous hairs on segments of legs. Abdominal segments 1 to 9 each six-annulate; first annulet without setae or tubercles; second and fourth annulets each with minute setae and tubercles; spiracular and surpedal lobes each with minute setae and tubercles. Inner surface of each proleg with several setae; suranal and subanal areas with numerous setae.

The prepupa (pl. XX, 253) is similar in coloration to that of the feeding stages except the head, which is amber to light brown. The head of the prepupa has widely separated coarse pits and the left mandible has four teeth and the right mandible three teeth, the teeth on each mandible being arranged in a linear row.

Holotypes.—Say's type is lost. The type of *E. bollii* Norton is at the Museum of Comparative Zoology, Harvard University, labeled "Dallas, Texas, Boll.," "77," "360," "Emphytus Bollii Norton, ♀," "Type 14010." *H. intermedius* Dyar is at the U.S. National Museum, type No. 13964, ♀, labeled "60." Dyar's "60" specimens are from Jefferson Highlands, N.H.

Distribution.—Eastern North America west to Minnesota and Texas (fig. 25): Newfoundland (insular), New Brunswick, Quebec, Maine, New Hampshire, Vermont, Massachusetts, Connecti-

cut, Ontario, New York, Pennsylvania, Virginia, Florida, Michigan, Ohio, Tennessee, Wisconsin, Illinois, Louisiana, Minnesota, Kansas, Texas.

Hosts.—*Cornus* sp., *C. alternifolia* L. f. Two specimens from Maine have *Solidago* as host labels.

Biology.—Raizenne (1957) reported that adults are found in the spring and larvae throughout August in Ontario. From information associated with reared specimens (Hopkins' Nos. 13656¹², 13664^h, and 13664ⁱ, all from Connecticut), larvae were collected from the host in August and early September and adults emerged the following years between the end of May to the first of August. Dyar (1897a) reported that eggs are laid on the lower epidermis close to the midrib of the leaf of the host. When mature, the larvae bore into dead wood to pupate. The record by Dyar (1897a) from whiteberry cane is probably a pupation site. Larvae will readily bore in cork left in rearing cages for pupation.

Discussion.—The white apical antennal segments and nearly entirely black coloration of the head and body will distinguish this species. Some specimens approach *testaceus* in coloration having more reddish-brown areas on the head and body, especially the abdomen, hence the description of *intermedius* by Dyar (1900). These, however, have the basal antennal segments black and the serrulae of the lancet much deeper than in *testaceus*. The larva can be recognized by the color pattern of the body; both the feeding stages and prepupa have a similar pattern.

Macremphytus testaceus (Norton)

Emphytus (*Harpiphorus*) *testaceus* Norton, 1861, p. 156; Norton, 1867, p. 229; Konow, 1905, p. 106.

Harpiphorus testaceus: Dalla Torre, 1894, p. 155; Dyar, 1900, p. 31.

Macremphytus testaceus: MacGillivray, 1916, p. 61; Ross, 1951, p. 59; Raizenne, 1957, p. 38.

Emphytus (*Harpiphorus*) *varianus* Norton, 1861, p. 156; Norton, 1867, p. 229; Provancher, 1878, p. 68; Provancher, 1883, p. 194; Konow, 1905, p. 107. New synonymy.

Harpiphorus varianus: Provancher, 1888, p. 348; Jack, 1889b, p. 520; Riley and Howard, 1890, p. 239; Dalla Torre, 1894, p. 155; Dyar, 1895a, p. 196; Dyar, 1897a, p. 22; Dyar, 1900, p. 30.

Macremphytus varianus: MacGillivray, 1908, p. 368; MacGillivray, 1916, p. 61; Will, 1944, p. 48; Ross, 1951, p. 59; Raizenne, 1957, p. 38; Will, 1959, p. 214.

Emphytus (*Harpiphorus*) *versicolor* Norton, 1867, p. 230; Provancher, 1878, p. 68; Provancher, 1883, p. 194; Dyar, 1897a, p. 22; Konow, 1905, p. 107; Ross, 1951, p. 59 (= *testaceus* Norton).

Harpiphorus versicolor: Provancher, 1888, p. 348; Dalla Torre, 1894, p. 155; Dyar, 1900, p. 30.

Macremphytus versicolor: MacGillivray, 1916, p. 61.

Female.—Length, 10.0 to 10.8 mm. Antenna with first and second segments reddish brown, third segment with basal half reddish brown, apical half black, fourth and fifth segments black, apical four segments white; sometimes all reddish brown except for apical white segments. Head mostly reddish brown with various amounts of black on postocellar area, ocellar area, and antennal and clypeal furrows; labrum white, maxillary and labial palpi brownish. Thorax black with tegulae and metascutellum whitish, mesoscutellum either whitish or black; posterior margin of pronotum, spots on mesoprescutum, and spots on inner margin of each lateral lobe of mesonotum sometimes reddish brown. Legs reddish brown to whitish; each coxa, extreme base of forefemur and midfemur, and extreme apex of hindfemur and hindtibia black. Abdomen reddish brown to dark brown. Wings very lightly, uniformly infuscated.

Clypeus with transverse ridge on anterior margin. Each serrula of lancet low, flat, with one anterior and four to six posterior subbasal teeth (pl. XX, 245).

Male.—Average length, 8.3 mm. Coloration similar to that of female except head, which sometimes has more black on frons and supraclypeal area. Structure as for female. Parapenis of genitalia with short, narrow apical lobe; penis valve oblong, rounded at apex, with minute dorsoapical spine (pl. XX, 246, 247).

Larva.—Structural characters for the larva are the same as those described for *tarsatus*. The color patterns of the feeding stage and prepupa differ as follows: The late feeding stages have the body unicolorous or only with a dark-brown spot at the apex of the 10th tergum; head black to dark brown with lower part of frons and area below antennae whitish. The prepupa has dark-brown spots on the body arranged in a subdorsal and supraspiracular stripe on each side, with one spot of each stripe per segment (pl. XXI, 254). Characters for separation of the prepupa and feeding stages are the same as those for *tarsatus*.

Holotypes.—I could not locate the type of *E. testaceus* Norton. The type of *E. varianus* Norton is at the Museum of Comparative Zoology, Harvard University, labeled "Type 14008," "*Emphytus varianus* Norton, Ct., ♂." The type of *E. versicolor* is at the Academy of Natural Sciences of Philadelphia, type No. 10316, labeled "Ill."; only the thorax, legs, and wings remain.

Distribution.—Eastern North America west to Minnesota and Colorado (fig. 24): New Brunswick, Quebec, Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Ontario, New York, New Jersey, Pennsylvania, Delaware, Maryland, District of Columbia, Virginia, North Carolina, Georgia, Michigan, Ohio,

Tennessee, Indiana, Wisconsin, Illinois, Manitoba, Minnesota, Iowa, Arkansas, Kansas, Saskatchewan, Colorado.

Hosts.—*Cornus* sp., *C. stolonifera* Michx., *C. candidissima* Marsh. One series from Caledonia, N.Y., has host labels *Viburnum*.

Biology.—Raizenne (1957) found adults of this species in the spring and larvae from early August to mid-September in Ontario. In Connecticut, according to information from various Hopkins' numbers, *testaceus* was recorded from the previous two *Cornus* species; larvae were collected the end of July and the first part of August and adults emerged in May and June of the following year. The same dates apply to rearings in Maryland. As for *tarsatus*, the mature larva burrows into wood or other substances such as cork for pupation. This may have resulted in other host labels on specimens such as *Viburnum*, *Betula*, *Platanus*, and *Impatiens*. True feeding hosts other than *Cornus* need further verification.

These data seem to support the occurrence of a single generation a year. However, I collected larvae from *Cornus* during the first of June 1970 in Virginia; the larvae readily bored into cork to pupate, and adults emerged during August of the same year.

Discussion.—This is the most commonly collected species of *Macremphytus* and may be separated from other species by the white apical antennal segments, white tegulae, reddish-brown hindfemur, and mostly reddish-brown head and body. The serrulae of the lancet are lower and flatter than those of *tarsatus*.

Genus TAXONUS Hartig

Taxonus Hartig, 1837, p. 297; Dalla Torre, 1894, p. 110; Konow, 1905, p. 108; Enslin, 1914, p. 214; Ross, 1937a, p. 92; Ross, 1937b, p. 93; Ross, 1951, p. 59; Benson, 1952, p. 92; Takeuchi, 1952, p. 41; Lorenz and Kraus, 1957, p. 108.

Type-species: *Tenthredo* (*Allantus*) *nitida* Klug. Designated by Rohwer, 1911b.

Ermilia O. Costa, 1859, p. 106; Dalla Torre, 1894, p. 63; Konow, 1905, p. 108 (= *Taxonus* Hartig).

Type-species: *Ermilia pulchella* O. Costa. Monotypic.

Strongylogastroides Ashmead, 1898, p. 308; Konow, 1905, p. 108 (= *Taxonus* Hartig); MacGillivray, 1916, p. 61; Yuasa, 1922, p. 51; Ross, 1937a, p. 92 (= *Taxonus* Hartig).

Type-species: *Allantus apicalis* Say. Original designation.

Parasiobla Ashmead, 1898, p. 308; Konow, 1905, p. 108 (= *Taxonus* Hartig).

Type-species: *Allantus rufocinctus* Norton. Original designation.

Hypotaxonus Ashmead, 1898, p. 311; Konow, 1905, p. 108 (= *Taxonus* Hartig); Rohwer, 1911b, p. 109.

Type-species: *Allantus pallipes* Say. Original designation.

Adult.—Antenna long, cylindrical, second segment longer than broad, third segment longer than fourth segment, segments be-

yond third gradually decreasing in length (pl. XXII, 262). Clypeus deeply circularly incised for half or more of its medial length, sometimes with transverse ridge (pl. XXII, 259–261); malar space slightly less than or equal to diameter of front ocellus; genal carina distinct and complete, even behind postocellar area; right mandible unidentate, left mandible with one or more subapical teeth (pl. XXII, 263–265). Mesopleuron without coarse punctures. Tarsal claw bifid, with acute basal lobe (as in pl. XIX, 240). Hindbasitarsus longer than remaining hindtarsal segments together. Forewing with anal crossvein oblique; first free sector of vein *Rs* present; veins *M* and *Rs* + *M* meeting *Sc* + *R* at same point (pl. XXI, 255). Hindwing with cells *Rs* and *M* usually both present (sometimes one or the other, or both missing); anal cell sessile (pl. XXI, 256). Hindwing of male with a peripheral vein, but sometimes atrophied.

Larva.—Only second and fourth annulets of abdominal segments 1 to 9 with small tubercles and setae; first annulet bare (pl. XXIV, 286). Thoracic legs normally slender, with trochanters equal to or longer than tibiae or femora. Prepupa without coarse, well-spaced punctures on head; each mandible with three teeth. Because the larvae are known for only two species, a satisfactory characterization cannot be made; the host and species descriptions should be checked in making identifications.

Discussion.—This is a rather large genus of about 30 species, only 1 of which is known in Europe, 9 in North America, and the others in Asia. The deeply emarginated clypeus, asymmetrical mandibles, cylindrical antennae, presence of the first free sector of vein *Rs* of the forewing, lack of large punctures on the mesopleuron, and presence of a peripheral vein in the hindwing of the male may be used in combination to separate members of this genus. *Taxonus* is most closely allied to *Allantus* and *Macremphytus*.

Species of this genus are commonly collected, but little is known of their hosts and biology. Because I have seen the larvae of only two species and only poor specimens of one of them, I am not giving a key to larvae.

Malaise (1963) separated the unit I am treating as *Taxonus* into four genera: *Taxonus*, *Strongylogastroidea*, *Hypotaxonus*, and *Parasiobla* (= *Polytaxonus*). His separation of *Parasiobla* is based on the absence of closed cells in the hindwing, a variable character especially in *rufocinctus* and *proximus*. Separation of the other three genera is based on the length of the hindbasitarsus and width of the malar space. I cannot accept any of these as adequate distinguishing characters for these genera. If separate generic units are recognized, they should be based on more reliable

characters such as the dentition of the mandibles (pl. XXII, 263-265).

Key to *Taxonus* Species

Adults

1. Female -----	2
Male -----	10
2. Basal three or four antennal segments reddish brown, apical segments black; left mandible with small subbasal tooth (pl. XXII, 264) ----- <i>T. epicera</i> (Say)	
Basal antennal segments black, at most with first two segments pale, apical segments black or white; left mandible with one or two subbasal teeth -----	3
3. Antenna black, at most with first two segments pale; left mandible with one or two subbasal teeth (pl. XXII, 263, 265) -----	4
Apical three or four segments of antenna white; left mandible with two large subbasal teeth (pl. XXII, 265) -----	8
4. Left mandible with two subbasal teeth (pl. XXII, 265) -----	5
Left mandible with one large subbasal tooth near base of mandible (pl. XXII, 263) -----	6
5. Head broad behind eyes (as in pl. XXI, 258); serrulae of lancet deep (pl. XXIII, 271); antenna entirely black -----	
----- <i>T. rufocinctus</i> (Norton)	
Head narrowing behind eyes (as in pl. XXI, 257); serrulae of lancet shallow (pl. XXIII, 270); first two antennal segments sometimes light orange ----- <i>T. proximus</i> (Provancher)	
6. Abdomen entirely orange; mesopleuron and pronotum reddish brown to orange ----- <i>T. pallipes</i> (Say)	
Apical abdominal segments black, sometimes lateral margins of abdomen black; mesopleuron and pronotum white or black ----	7
7. Head broad behind eyes (as in pl. XXI, 258); mesopleuron and pectus black; only apical two or three abdominal segments black -----	
----- <i>T. pallicoxus</i> (Provancher)	
Head narrowing behind eyes (as in pl. XXI, 257); mesopleuron and pectus white or black; abdomen black with central terga orange and sterna sometimes whitish ----- <i>T. borealis</i> MacGillivray	
8. Inner orbits white; considerable white markings on head -----	
----- <i>T. pallidicornis</i> (Norton)	
Head rufous and/or black, with combinations of both colors -----	9
9. Hindfemur black; serrulae of lancet shallow, close together (pl. XXIII, 272); head narrowing behind eyes (pl. XXI, 257) ----	
----- <i>T. spiculatus</i> (MacGillivray)	
Hindfemur rufous; serrulae of lancet deeper and farther apart (pl. XXIII, 273); head broad behind eyes (pl. XXI, 258) -----	
----- <i>T. terminalis</i> (Say)	
10. Part of third antennal segment reddish brown; left mandible with small subbasal tooth (pl. XXII, 264) ----- <i>T. epicera</i> (Say)	
Third antennal segment black; left mandible with one or two large subbasal teeth (pl. XXII, 263, 265) -----	11
11. Left mandible with one large subbasal tooth near base (pl. XXII, 263) -----	12
Left mandible with two subbasal teeth (pl. XXII, 265) -----	14

12. Head narrowing behind eyes (as in pl. XXI, 257); lateral margins of abdomen black ----- *T. borealis* MacGillivray
 Head broad behind eyes (as in pl. XXI, 258); abdomen orange with only apical three segments black ----- 13
13. Pronotum, and usually mesopleuron and mesoprescutum orange ----- *T. pallipes* (Say)
 Pronotum black, at most with narrow white posterior margin; mesopleuron and mesoprescutum black --- *T. pallicoxus* (Provancher)
14. Antenna black with apical four to five segments white ----- 15
 Antenna black ----- 17
15. Inner orbits white ----- *T. pallidicornis* (Norton)
 Inner orbits black or rufous ----- 16
16. Head narrowing behind eyes (pl. XXI, 257); hindfemur usually black ----- *T. spiculatus* (MacGillivray)
 Head broad behind eyes (pl. XXI, 258); hindfemur rufous ----- *T. terminalis* (Say)
17. Head narrowing behind eyes (as in pl. XXI, 257); mesoscutellum white ----- *T. proximus* (Provancher)
 Head broad behind eyes (as in pl. XXI, 258); mesoscutellum black ----- *T. rufocinctus* (Norton)

Descriptions of *Taxonus* Species

Taxonus borealis MacGillivray

Taxonus borealis MacGillivray, 1895, p. 78; Konow, 1905, p. 109; Ross, 1951, p. 60 (= *pallicoxus* Provancher).

Female.—Length, 5.9 to 6.2 mm. Antenna black; ventral surface of apical segments brownish. Head black; clypeus and mouthparts except apex of each mandible white. Thorax black with posterior margin of pronotum and tegulae white; mesopleuron and pectus variable, both black or pectus and lower portion of mesopleuron white and upper portion of mesopleuron black. Legs orange to white, line on outer surface of midtarsus, hindtibia, and hindtarsus black. Abdomen black with venter whitish and central portion of each tergum except basal plates pale orange or central portions of terga 3 to 5 orange; from above, pattern of abdomen usually appearing black with central pale orange spot or stripe extending length of abdomen. Wings hyaline; stigma with basal half white, apical half black.

Clypeus deeply, circularly incised, without distinct ridge on anterior margin (as in pl. XXII, 259). Malar space slightly wider than diameter of front ocellus. Left mandible with one large subbasal tooth located near base (as in pl. XXII, 263). Head from above strongly narrowing behind eyes (as in pl. XXI, 257). Sheath long, slightly rounded below and at apex. Each serrula of lancet low, rounded, with one or two anterior and three or four posterior subbasal teeth (pl. XXII, 266).

Male.—Length, 5.4 to 5.7 mm. Coloration similar to that of female, but usually with apical abdominal segments black and abdomen from above appearing black with central orange spot. Structure similar to that of female. Hindwing with peripheral vein. Parapenis of genitalia with narrow apical lobe; penis valve oblong, obliquely truncated at apex, with few short spines on dorsal margin (pl. XXIII, 277).

Larva.—Unknown.

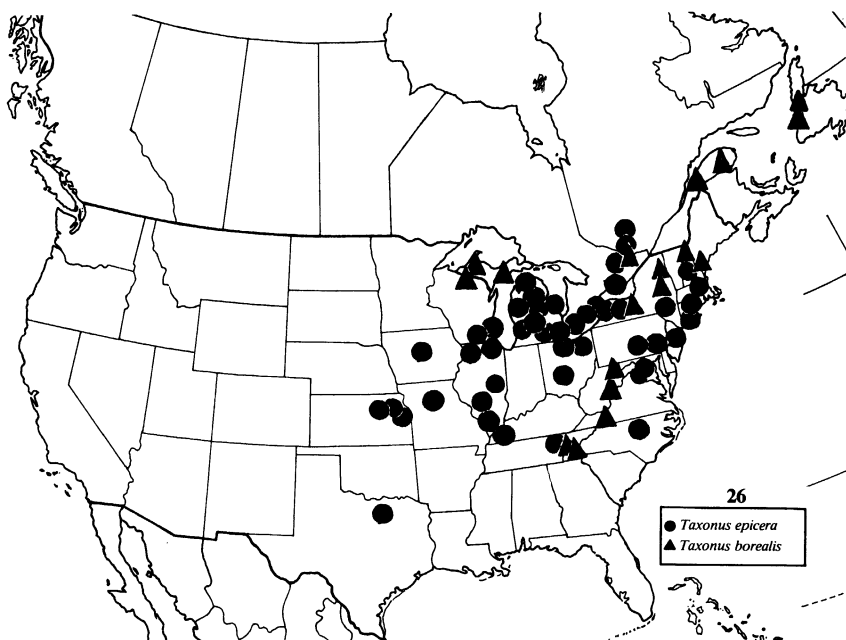
Holotype.—At the Illinois Natural History Survey, ♀, “Mt. Wash’n,” “Mrs. Slosson, collector.”

Distribution.—Eastern North America (fig. 26): Newfoundland (insular), Quebec, Maine, New Hampshire, Ontario, New York, Virginia, West Virginia, North Carolina, Tennessee, Michigan, Wisconsin.

Host.—Unknown.

Biology.—Unknown.

Discussion.—Because of the similarity of *borealis* and *pallidicornis*, Ross (1951) synonymized the two species. However, *borealis* is distinct, and color and genitalia differences may be used to separate the two species. The black mesonotum, white pectus in some specimens, black lateral margins of the abdomen, and the head more strongly narrowing behind the eyes will serve to separate *borealis*. The abdomen has two patterns, either black with a



central orange area or only the lateral margins black with a pale stripe down the full length of the abdomen.

This appears to be a northern species with a southern extension down the Appalachian Mountains to Tennessee and North Carolina.

Taxonus epicera (Say)

Allantus epicera Say, 1836, p. 216; LeConte, 1859, p. 677; Norton, 1860, p. 243.

Strongylogaster epicera: Norton, 1868, p. 217; Provancher, 1878, p. 168; Provancher, 1883, p. 217; Dalla Torre, 1894, p. 134.

Taxonus epicera: Konow, 1905, p. 109; Ross, 1951, p. 60.

Strongylogastroidea epicera: MacGillivray, 1916, p. 64.

Female.—Length, 7.5 to 7.9 mm. Antenna with first two segments reddish brown, third segment reddish brown with ventral surface partly black toward apex, fourth segment mostly black with dorsal surface reddish brown near base, segments beyond fourth black. Head black with clypeus either reddish brown or black with white spot on each half and labrum and other mouthparts except apex of each mandible whitish. Thorax black with posterior half of pronotum and all of tegulae whitish; mesoscutellum sometimes reddish brown. Legs orange with basal half of each coxa black and apical half of each coxa whitish. Abdomen orange; basal plates and sheath black; sheath may have orange spot on lower third. Wings hyaline; stigma with basal half white, apical half black.

Clypeus deeply, circularly incised, with transverse ridge on anterior margin (pl. XXII, 260). Malar space slightly less than diameter of front ocellus. Left mandible with small subbasal tooth (pl. XXII, 264). Sheath long, straight above and below, slightly rounded at apex. Each serrula of lancet low, broad, rounded, with one anterior and two or three small posterior subbasal teeth (pl. XXII, 267).

Male.—Length, 6.6 to 6.9 mm. Coloration similar to that of female except fourth antennal segment, which is usually all black, and clypeus, which is sometimes entirely black. Structure similar to that of female. Hindwing with peripheral vein. Parapenis of genitalia with narrow apical lobe; penis valve oblong, with small spine on dorsolateral margin, apex rounded, and dorsal margin serrated (pl. XXIII, 278).

Larva.—Unknown.

Holotype.—Say's types are lost.

Distribution.—Eastern North America (fig. 26): Quebec, New Hampshire, Massachusetts, Connecticut, Ontario, New York, Penn-

sylvania, New Jersey, Maryland, Virginia, North Carolina, Kentucky, Tennessee, Ohio, Michigan, Wisconsin, Illinois, Iowa, Missouri, Kansas, Texas.

Host.—Unknown.

Biology.—Unknown. Most adult collection dates are from late April to the middle of June with a few in July, August, and the first of September.

Discussion.—A distinct species that is recognized by the reddish-brown basal antennal segments and black apical segments.

Taxonus pallicoxus (Provancher)

Tenthredo (*Taxonus*) *unicinctus* Norton, 1862a, p. 119. Preoccupied by *Tenthredo uncinata* Brullé, 1832.

Taxonus uncinatus: Norton, 1868, p. 211; Provancher, 1878, p. 165; Provancher, 1883, p. 214; Dalla Torre, 1894, p. 112; Konow, 1905, p. 110.

Strongylogastroidea uncinata: MacGillivray, 1908, p. 366; MacGillivray, 1916, p. 64.

Strongylogaster pallicoxus Provancher, 1889, p. 11; Smith, 1975b, p. 300.

Taxonus pallicoxus: Konow, 1905, p. 109; Ross, 1951, p. 60.

Strongylogaster pallidicoxis Dalla Torre, 1894, p. 137. Emendation.

Strongylogastroidea rufocinctana MacGillivray, 1923d, p. 31; Ross, 1951, p. 60 (= *pallicoxus* Provancher).

Female.—Length, 6.4 to 6.8 mm. Antenna black, ventral surface of apical segments sometimes brownish. Head black, clypeus and mouthparts except apex of each mandible whitish. Thorax black with posterior margin of pronotum and tegulae white. Legs orange, each coxa white, midtarsus and hindtarsus infuscated to black, extreme apex of hindfemur black. Abdomen with basal plates and second tergum black, terga 3 to 5 orange, terga beyond fifth black; sterna pale orange to white with apical two or three black. Wings hyaline; basal half of stigma white, apical half black.

Clypeus deeply, circularly incised; anterior margin not ridged (pl. XXII, 259). Malar space equal to diameter of front ocellus. Left mandible with one large subbasal tooth located near base (pl. XXII, 263). Sheath long, straight above, rounded below and at apex. Each serrula moderately high, rounded, with one large anterior and three or four small posterior subbasal teeth (pl. XXII, 268).

Male.—Length, 5.8 to 6.2 mm. Coloration and structure similar to those of female. Hindwing with peripheral vein. Parapenis of genitalia with narrow apical lobe; penis valve oblong, rounded at apex, with short dorsoapical spine, and serrations on dorsal margin (pl. XXIII, 276).

Larva.—Late feeding stage, 11 to 16 mm long. Head amber with dark-brown spot behind each eye, one on vertex, and one on

upper half of frons; eyespot and apex of each mandible black (pl. XXIV, 291). Body uniformly colored, probably green when alive.

Head sparsely covered with moderately long hairs. Clypeus with 4 setae; labrum with 6 setae; epipharynx with arcuate row of 14 to 18 spines on each half (pl. XXIV, 290). Left mandible with two ventral teeth, inner tooth truncate and deep notch separating the two, three dorsal teeth, inner tooth broad and truncate, and a mesial ridge without teeth connecting outer dorsal tooth with inner ventral tooth and forming elevated area; right mandible with two ventral teeth, two dorsal teeth the inner tooth broad and truncate, and mesial ridge with two small teeth connecting outer dorsal tooth with inner ventral tooth; each mandible with one seta on outer surface (pl. XXIV, 287, 288). Maxillary palpus 4-segmented; second segment with 1 seta, palpifer with 4 setae, stipes with 1 seta; lacinia with row of 12 to 14 spines (pl. XXIV, 289). Labial palpus three-segmented, second segment with one seta; submentum with six setae.

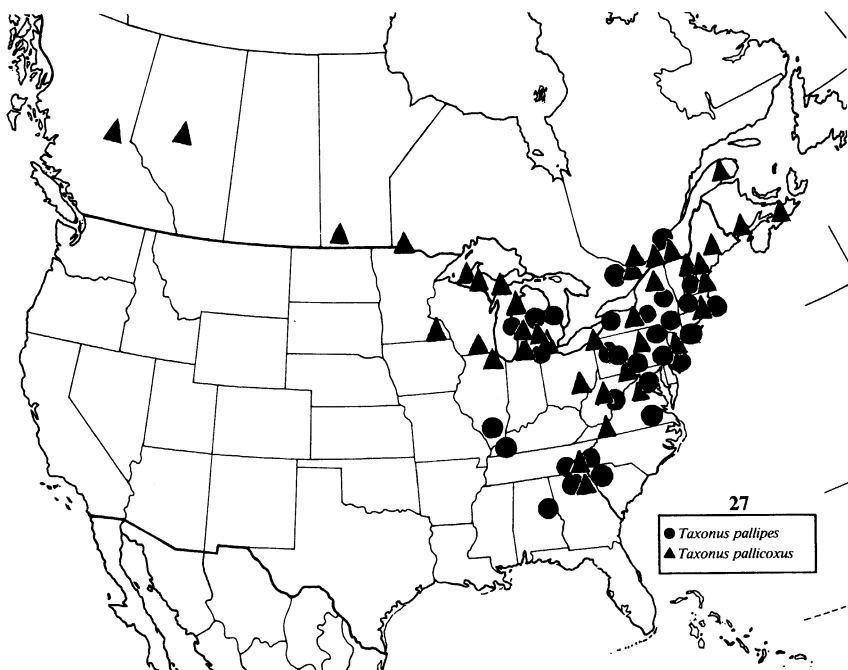
Thoracic legs rather slender with trochanter as long as or longer than femur and also tibia. Abdominal segments 1 to 9 each six-annulate; annulets 2 and 4 with minute setae and tubercles; setae and at least one tubercle on each spiracular lobe and surpedal lobe. Several setae on inner surface of each proleg (pl. XXIV, 286). Suranal and subanal areas with numerous setae.

Holotypes.—I could not find the type of *T. unicinctus* Norton. Provancher's type of *S. pallicoxus* is at the Museum of Quebec, Laval University, ♀, with yellow label "1149" and bearing a name label (Smith, 1975b). The type of *S. rufocinctana* MacGillivray is at the Illinois Natural History Survey, ♀, labeled "Richmond Hill, L.I., June 1, 1903."

Distribution.—Eastern North America west to British Columbia in Canada (fig. 27): Nova Scotia, New Brunswick, Quebec, Maine, New Hampshire, Massachusetts, Rhode Island, Ontario, New York, Pennsylvania, New Jersey, Maryland, Virginia, North Carolina, Georgia, Michigan, Ohio, Wisconsin, Illinois, Manitoba, Minnesota, Alberta, British Columbia.

Host.—*Fragaria* sp.

Biology.—A series of adults bearing Hopkins' No. 10783^f was reared from larvae feeding on wild strawberry, *Fragaria* sp., at Falls Church, Va. Larvae were collected June 21, 1921, and were feeding singly on the underside of the leaves. By July 21, all larvae had bored into "brushy wood" to pupate, and on August 8, 1921, adults began to emerge. Emergence continued through August 18 of the same year and no further emergence was found



the following year, 1922. There are apparently two generations a year with adults appearing in spring and in August.

Discussion.—This species, *pallipes*, and *borealis* each have a single large subbasal tooth near the inner base of the left mandible. The black mesopleuron, black pronotum with the posterior margin white, black apical abdominal segments, and entirely orange abdominal terga 3 to 5 will separate *pallidicornis*.

Taxonus pallidicornis (Norton)

Strongylogaster pallidicornis Norton, 1868, p. 216; Provancher, 1882, p. 295;

Provancher, 1883, p. 744; Dalla Torre, 1894, p. 137.

Taxonus pallidicornis: Konow, 1905, p. 110; Ross, 1951, p. 60.

Strongylogastroidea pallidicornis: MacGillivray, 1916, p. 64.

Female.—Length, 9.8 to 10.3 mm. Antenna black with apical four segments white. Head with black and white color pattern; clypeus, supraclypeal area, inner orbits, lower outer orbits, and occipital margin except postocellar area white; labrum and mouth-parts except apex of each mandible white. Thorax black with most of mesopleuron and pronotum orange; posterior margin of pronotum, line on posterior margin of mesopleuron, V-shaped mark on mesoprescutum, and most of mesoscutellum and metascutellum white. Legs entirely orange; each coxa whitish. Abdomen and

sheath orange. Wings hyaline; apical half of stigma brown, basal half white.

Clypeus deeply, circularly incised, anterior ridge not distinct (as in pl. XXII, 261). Malar space slightly less than diameter of front ocellus. Left mandible with two subbasal teeth, a large one near base, a smaller one near apex (as in pl. XXII, 265). Head broadened behind eyes (as in pl. XXI, 258). Sheath straight above, slightly rounded below and at apex. Each serrula of lancet rounded, about as long as broad, with one prominent anterior and two smaller posterior subbasal teeth (as in pl. XXIII, 273).

Male.—Average length, 8.5 mm. Coloration similar to that of female except mesopleuron, which is sometimes all white, and pectus, which is sometimes partly orange. Structure as for female. Hindwing with peripheral vein. Parapenis of genitalia with long, narrow, apical lobe; penis valve broad, head of valve rectangular, with short dorsoapical lobe and dorsoapical margin serrated (pl. XXIV, 284).

Larva.—One reared specimen is associated with Hopkins' No. 11388. The following information on the larva is associated with this number: "Bluish white dorsally, yellowish ventrally including legs and prolegs, dorsal and lateral surfaces with bloom or white powder. Black spotted, a dorsal row one spot per segment; a pair of subdorsal rows with three spots per segment; and a pair of lateral rows (above pleural fold) with two per segment. Head powdery large, dorsal one-third blackish blue; eyes in black spots at lateral areas of head and situated at the end of a bluish intrusion into the paler area below."

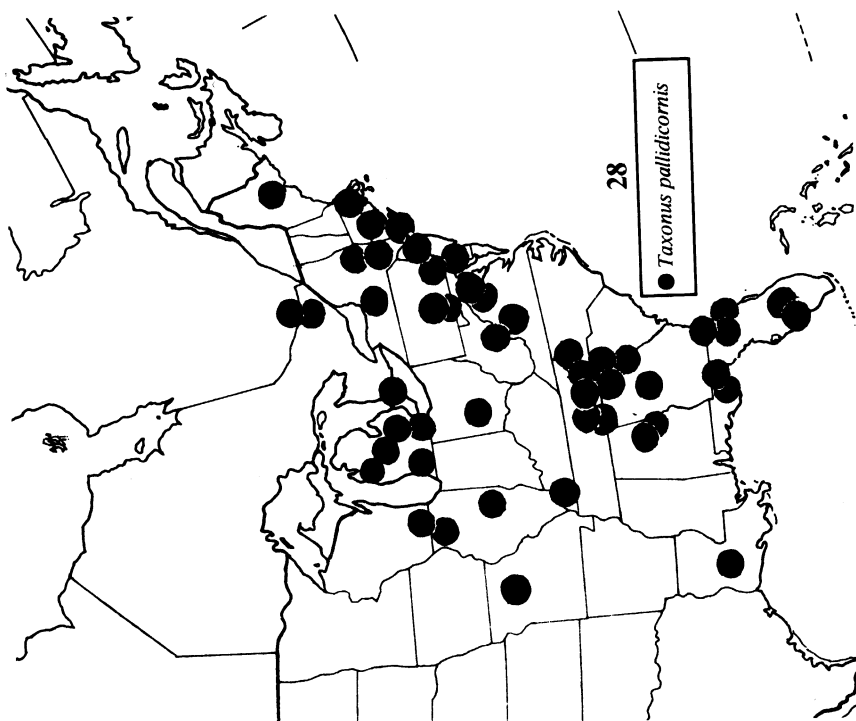
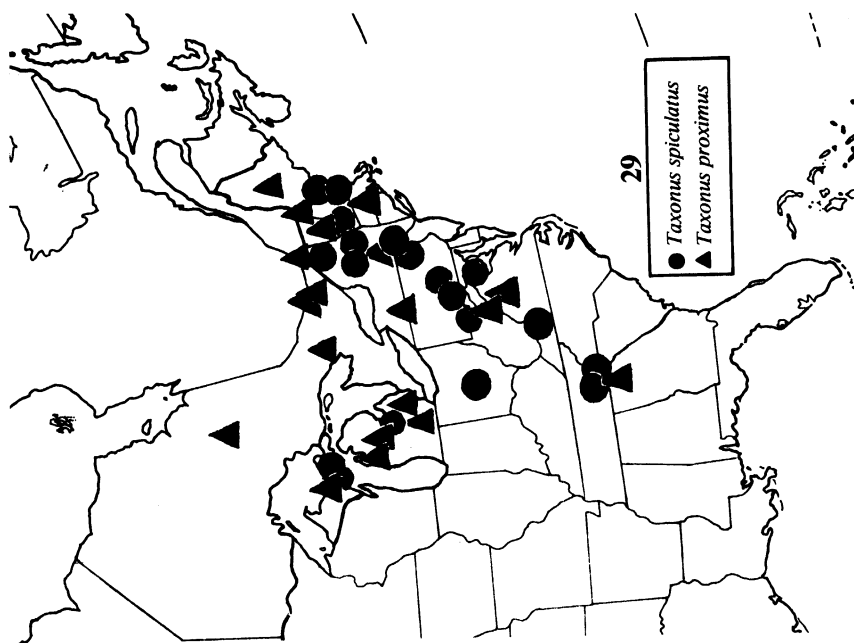
Several larvae from Florida have the head amber with a large spot on vertex and large eyespots black. The body is whitish with a dark spot surrounding each spiracle. Structural features are similar to those of the *pallidicornis* larva.

Holotype.—Norton's type of *pallidicornis* is at the Academy of Natural Sciences of Philadelphia, type No. 267, ♀, without locality data.

Distribution.—Eastern North America (fig. 28): Quebec, Maine, Massachusetts, Connecticut, Ontario, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, Georgia, Michigan, Ohio, West Virginia, Kentucky, Tennessee, Alabama, Wisconsin, Illinois, Missouri, Louisiana.

Host.—*Rubus* sp.

Biology.—According to information associated with Hopkins' No. 11388, two larvae were collected from *Rubus* on July 29, 1913, at Falls Church, Va. By August 4, both larvae disappeared, and on August 25, 1913, one female emerged. Judging from this and



the dates of capture of other specimens that range from April to August, there are at least two generations a year.

Discussion.—The white and black pattern of the head will separate *pallidicornis* from other *Taxonus* species with two subbasal teeth on the left mandible. Structurally it is almost identical to *terminalis*, but because of lack of intermediate color forms, I am choosing to keep it separate.

Taxonus pallipes (Say)

Allantus pallipes Say, 1823, p. 72; LeConte, 1859, p. 162; Norton, 1860, p. 243.

Strongylogaster pallipes: Norton, 1868, p. 218.

Taxonus pallipes: Konow, 1905, p. 109; Ross, 1951, p. 60.

Strongylogastroidea pallipes: MacGillivray, 1916, p. 64.

Strongylogaster pallidipes Dalla Torre, 1894, p. 137. Emendation.

Strongylogastroidea rufula MacGillivray, 1923d, p. 32; Ross, 1951, p. 60 (= *pallipes* Say).

Female.—Length, 7.2 to 7.5 mm. Antenna black; first two antennal segments sometimes brownish. Head black; clypeus and mouthparts except apex of each mandible white. Thorax black with pronotum, part or all of mesopleuron, tegulae, mesopre-scutum, inner margin of each lateral lobe, mesoscutellum, and spot on metascutellum orange. Legs orange; each coxa whitish and mid-femur and hindfemur infuscated to black. Abdomen orange with mesial portion of basal plates black and outer margin of sheath black. Wings hyaline; stigma with apical half black, basal half white.

Clypeus deeply, circularly incised, without distinct ridge on anterior margin (as in pl. XXII, 259). Malar space equal to diameter of front ocellus. Left mandible with one large subbasal tooth located near base (as in pl. XXII, 263). Sheath straight above, slightly rounded below and at apex. Each serrula of lancet low, rounded, broader than long, with one prominent anterior and two smaller posterior subbasal teeth (pl. XXII, 269).

Male.—Length, 6.2 to 6.5 mm. Coloration similar to that of female except apical two or three abdominal segments, which are black. Structure similar to that of female. Hindwing with peripheral vein. Parapenis of genitalia with long, narrow apical lobe; penis valve oblong, rounded at apex, with minute dorsoapical spine and dorsal margin serrated (pl. XXIII, 274, 275).

Larva.—Unknown.

Holotypes.—Say's type is lost. The type of *S. rufula* MacGillivray is at the Illinois Natural History Survey, ♀, labeled "Ithaca, N.Y., 11 Aug. '04."

Distribution.—Eastern North America (fig. 27): Quebec, New Hampshire, Massachusetts, Connecticut, Rhode Island, Ontario, New York, New Jersey, Pennsylvania, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, Kentucky, Tennessee, South Carolina, Georgia, Alabama, Michigan, Illinois.

Host.—Unknown.

Biology.—Unknown. Adult collection records range from the middle of May to the first of August.

Discussion.—The orange pronotum, mesopleuron, mesopre-scutum, and mesoscutellum and the entirely orange abdomen of the female will separate *pallipes* from its closest relatives, *borealis* and *pallicoxus*. These are the only three species of *Taxonus*, other than *epicera* with which *pallipes* could be confused, that have a single large subbasal tooth on the left mandible.

Taxonus proximus (Provancher)

Strongylogaster proximus Provancher, 1885, p. 12; Dalla Torre, 1894, p. 137; Smith, 1975b, p. 300.

Taxonus proximus: Konow, 1905, p. 109; Ross, 1951, p. 60.

Strongylogastroidea proxima: MacGillivray, 1916, p. 64.

Strongylogastroidea rufinerva MacGillivray, 1923d, p. 31; Ross, 1951, p. 60 (= *proximus* Provancher).

Female.—Length, 7.6 to 7.9 mm. Antenna black with first two segments pale orange. Head black with clypeus pale orange to reddish brown and labrum and mouthparts except apex of each mandible white. Thorax black with posterior margin of pronotum, tegulae, mesoscutellum, and metascutellum pale orange to whitish. Legs entirely orange, only apex and other surface of hindcoxa whitish. Abdomen orange with basal plates infuscated and sheath black. Wings hyaline to very lightly uniformly infuscated; apical half of stigma black, basal half white.

Clypeus deeply, circularly incised, without distinct ridge on anterior margin (as in pl. XXII, 261). Malar space narrower than diameter of front ocellus. Left mandible with two subapical teeth, one large tooth near base and one smaller tooth near apex (as in pl. XXII, 265). Head narrowing behind eyes (as in pl. XXI, 257). Sheath straight above, slightly rounded below and at apex. Hindwing with cells *Rs* or both *Rs* and *M* sometimes absent. Lancet with about 19 serrulae, each serrula low, rounded, with 1 prominent anterior subbasal tooth near ventral margin of lancet and no distinct posterior subbasal teeth; distance between serrulae less than breadth of 1 (pl. XXIII, 270).

Male.—Unknown.

Larva.—Unknown.

Holotypes.—*S. proxima* Provancher: In the Canadian National Collection, ♀, with labels "7," "Type Strongylogaster proximus 115," "Type *S. proximus* 356 Prov.," and "Lectotype, *St. proximus* Prov., Commeau, Apr. 1940" (Smith, 1975b). *S. rufinerva* MacGillivray: At the Illinois History Survey, ♀, "Glen to Halfway H., White Mt., N.H., July 8, 1891."

Distribution.—Eastern United States and eastern Canada (fig. 29): Quebec, Maine, New Hampshire, Vermont, Massachusetts, Ontario, New York, Virginia, West Virginia, Georgia, Michigan.

Host.—*Rubus* is the host on a specimen from Massachusetts.

Biology.—Unknown. All adults examined were captured from the middle of July to the middle of August.

Discussion.—This species falls in the group of *Taxonus* species with two subapical teeth on the left mandible. It is most likely to be confused with *rufocinctus*, especially those *rufocinctus* specimens with the abdomen orange; however, the head which narrows more abruptly behind the eyes, the basal two antennal segments which are pale, and the pale clypeus, mesoscutellum, and metascutellum should distinguish *proximus*. Also the serrulae of the lancet in *proximus* are lower, broader, and closer together than are those of *rufocinctus*.

Taxonus rufocinctus (Norton)

Allantus rufocinctus Norton, 1860, p. 248.

Strongylogaster rufocinctus: Norton, 1868, p. 217; Provancher, 1882, p. 295 (*rubrocinctus* (!)); Provancher, 1883, p. 744 (*rubrocinctus* (!)); Provancher, 1885, p. 10; Dalla Torre, 1894, p. 138.

Taxonus rufocinctus: Konow, 1905, p. 110; Ross, 1937b, p. 93; Ross, 1951, p. 60.

Strongylogastroidea rufocinctus: MacGillivray, 1916, p. 64.

Taxonus (*Parasiobla*) *rufocinctus virginicus* Rohwer, 1911a, p. 405; Ross, 1951, p. 60 (= *rufocinctus* Norton).

Strongylogastroidea uncinella MacGillivray, 1923d, p. 33; Ross, 1951, p. 60 (= *rufocinctus* Norton).

Female.—Length, 8.7 to 9.0 mm. Antenna and head black; clypeus sometimes with lateral lips reddish brown; labrum and other mouthparts except apex of each mandible white. Thorax black; tegulae brownish to orange. Legs rufous with each coxa and trochanter black; apex of each coxa sometimes whitish; hindtarsus usually black. Abdomen orange with basal plates and apical three or four segments black, or orange with only basal plates black, with intermediates; sheath black. Wings hyaline to very lightly, uniformly infuscated; apical half of stigma black, basal half whitish.

Clypeus deeply, circularly incised, without distinct ridge on anterior margin (as in pl. XXII, 261). Malar space equal to or slightly less than diameter of front ocellus. Left mandible with two subbasal teeth, a large one near base, a smaller one near apex (as in pl. XXII, 265). Head broadened behind eyes (as in pl. XXI, 258). Sheath long, straight above, slightly rounded below and at apex. Hindwing with cells *Rs* or both *Rs* and *M* usually absent. Each serrula of lancet moderately deep, as long as broad, rounded at apex, and with one prominent anterior and two smaller posterior subbasal teeth all located near ventral margin of lancet (pl. XXIII, 271).

Male.—Length, 8.1 to 8.5 mm. Coloration and structure similar to those of female. Hindwing with peripheral vein. Parapenis of genitalia with narrow apical lobe; penis valve oblong, with broadly rounded dorsal lobe, small spine on dorsoapical margin, and dorsal margin serrated (pl. XXIV, 279, 280).

Larva.—Unknown.

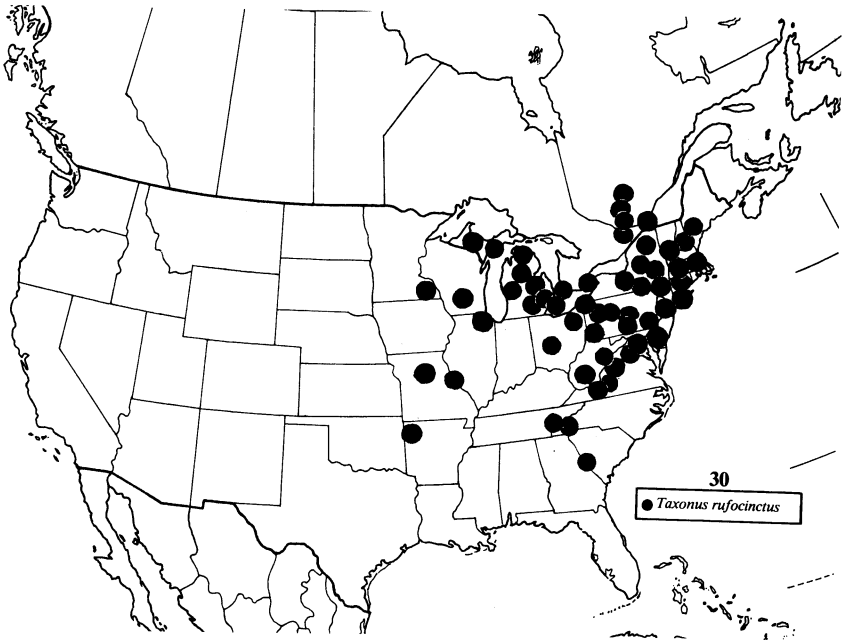
Holotypes.—The lectotype, by present designation, of *A. rufocinctus* Norton is at the Museum of Comparative Zoology, Harvard University, ♀, labeled "Ct." and "Type No. 14005." There is also a male at the same museum with the same labels. A specimen of *rufocinctus* at the Academy of Natural Sciences of Philadelphia is labeled "Ct." and "*S. rufocinctus* Nort., TYPE, ♀, chosen by Rohwer." The latter is in Rohwer's handwriting. Rohwer (1911a) stated that he chose a "proxotype" at Philadelphia, but I regard this as a homotype rather than a lectotype designation. Also, most of Norton's early work was done in Boston, and even though Norton may have taken some of the original 16 specimens he described to Philadelphia, I believe the type should be in his collection at the Museum of Comparative Zoology.

T. rufocinctus virginicus Rohwer: At the U.S. National Museum, type No. 13840, ♀, "Great Falls, Va., 19 Aug.," "collection N. Banks." *S. uncinetella* MacGillivray: At the Illinois Natural History Survey, ♀, "Ithaca, N.Y., 10 Aug. '04."

Distribution.—Eastern North America (fig. 30): Quebec, Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Ontario, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, Georgia, Ohio, West Virginia, Tennessee, Michigan, Wisconsin, Illinois, Minnesota, Missouri, Arkansas.

Host.—Unknown.

Biology.—Unknown. Dates of capture are distributed rather evenly between the first of May and the end of August.



Discussion.—The black antennae, black head, and black thorax except the paler tegulae will distinguish this species from the other species of *Taxonus* that have two subbasal teeth on the left mandible. Most specimens have the apical abdominal segments black; however, a few have the abdomen entirely orange. This latter color variant resulted in the description of *rufocinctus virginicus*. Also, those specimens with the abdomen all orange may be confused with *proximus*, but *proximus* usually has the basal two antennal segments whitish and the head is much more narrowed behind the eyes when viewed from above. Cells *Rs* and *M* of the hindwing are usually absent in *rufocinctus*, thereby differing from most other species of *Taxonus* that have the two cells almost always present.

This species is commonly collected by sweeping shrubbery, but nothing is known concerning its host or biology.

Taxonus spiculatus (MacGillivray)

Strongylogastroidea spiculata MacGillivray, 1908, p. 369.

Taxonus spiculatus: Ross, 1951, p. 60.

Female.—Length, 9.3 to 9.8 mm. Antenna black with apical three or four segments white. Head mostly reddish brown with

ocellar and postocellar areas and sometimes antennal and clypeal furrows black; clypeus, labrum, and other mouthparts except apex of each mandible white. Thorax dark reddish brown to black with mesopleuron, pronotum, and mesoprescutum paler reddish brown and posterior margin of pronotum, tegulae, and mesoscutellum white. Legs reddish brown to rufous with base of each coxa, basal half of midfemur and forefemur, all of hindfemur, and extreme apex of hindtibia black. Abdomen orange to reddish brown with basal plates and sheath black. Wings hyaline; apical half of stigma black, basal half white.

Clypeus deeply, circularly cleft, without distinct ridge on anterior margin (as in pl. XXII, 261). Malar space less than diameter of front ocellus. Left mandible with two subbasal teeth, one large tooth near base and one smaller tooth near apex (as in pl. XXII, 265). Head narrowed behind eyes (pl. XXI, 257). Sheath straight above, straight below, slightly rounded at apex. Each serrula of lancet low, broader than long, rounded, with one anterior subbasal tooth near ventral margin of lancet (pl. XXIII, 272).

Male.—Length, 7.1 to 7.5 mm. Coloration similar to that of female except pronotum, which is white, forefemur and midfemur, basal two antennal segments, and basal plates, which are pale orange, and head, which is mostly black. Structure similar to that of female. Hindwing with peripheral vein. Parapenis of genitalia with narrow apical lobe; penis valve broad, head rectangular, with dorsoapical lobe and serrated dorsal margin (pl. XXIV, 285).

Larva.—Unknown.

Holotype.—The type of *S. spiculatus* is at the Illinois Natural History Survey, ♀, "Ellenville, N.Y.," "Chester Young, collector."

Distribution.—Eastern North America (fig. 29): Maine, New Hampshire, Vermont, New York, Pennsylvania, Maryland, Virginia, North Carolina, Ohio, West Virginia, Tennessee, Michigan.

Host.—Unknown. One adult was collected from *Rubus*.

Biology.—Unknown. Adults have been captured from the first of June to the middle of August.

Discussion.—This species is in the group of *Taxonus* that has two subapical teeth on the left mandible. Though the lancet is more similar to that of *proximus*, the coloration is more similar to that of *terminalis* and *pallidicornis*. In most specimens, the black hindfemur will separate *spiculatus*, but other characters should be utilized such as the low serrulae of the lancet and the head, which narrows more abruptly behind the eyes in dorsal view than does that of *terminalis* or *pallidicornis*.

Taxonus terminalis (Say)

Tenthredo terminalis Say, 1824, p. 318; LeConte, 1859, p. 213.

Allantus terminalis: Norton, 1860, p. 236.

Strongylogaster terminalis: Norton, 1868, p. 215; Provancher, 1878, p. 167; Provancher, 1883, p. 217; Dalla Torre, 1894, p. 138.

Taxonus terminalis: Konow, 1905, p. 110; Ross, 1951, p. 60.

Strongylogastroidea terminalis: MacGillivray, 1916, p. 64.

Allantus apicalis Say, 1836, p. 216; LeConte, 1859, p. 676; Norton, 1860, p. 237; Konow, 1905, p. 110 (= *terminalis* Say).

Strongylogaster apicalis: Norton, 1868, p. 216; Provancher, 1878, p. 168; Provancher, 1883, p. 217; Dalla Torre, 1894, p. 133; Dyar, 1895b, p. 339; Dyar, 1895c, p. 312.

Strongylogastroidea apicalis: MacGillivray, 1916, p. 64.

Allantus abdominalis Norton, 1860, p. 238; Dalla Torre, 1894, p. 138 (= *terminalis* Say).

Allantus mellosus Norton, 1860, p. 237; Konow, 1905, p. 110 (= *terminalis* Say).

Strongylogaster mellosus: Norton, 1868, p. 215; Dalla Torre, 1894, p. 135.

Strongylogastroidea mellosus: MacGillivray, 1916, p. 64.

Taxonus mellosus: Ross, 1951, p. 60.

Strongylogaster rufoculus MacGillivray, 1894, p. 327; Konow, 1905, p. 110 (= *terminalis* Say).

Strongylogastroidea confusa MacGillivray, 1908, p. 369; Ross, 1951, p. 60 (= *terminalis* Say).

Strongylogastroidea shermani MacGillivray, 1923d, p. 32; Ross, 1951, p. 60 (= *terminalis* Say).

Female.—Length, 9.4 to 9.8 mm. Antenna black with apical four segments white. Coloration of head and body extremely variable: Clypeus and mouthparts except apex of each mandible whitish; head entirely orange to reddish brown, entirely black, or with intermediates such as black with orbits reddish brown. Thorax orange with cervical sclerites, pectus, and spots on lateral lobes of mesonotum black, and mesoscutellum and metascutellum white or mostly black with tegulae, mesoscutellum, posterior margin of pronotum, and mesopleuron whitish to pale orange. Legs orange to rufous, each coxa either white or black. Abdomen orange to reddish brown, basal plates and sheath sometimes black. Wings hyaline to very lightly infuscated; apical half of stigma black, basal half white.

Clypeus deeply, circularly incised, without distinct anterior ridge (pl. XXII, 261). Malar space slightly less than diameter of front ocellus. Left mandible with two subbasal teeth, one large tooth near base and one smaller tooth near apex (pl. XXII, 265). Head broadened behind eyes (pl. XXI, 258). Sheath straight above, slightly rounded below and at apex. Each serrula of lancet moderately deep, far apart, about as long as broad, rounded at

apex, and with one anterior and one or two posterior subbasal teeth situated near ventral margin of lancet (pl. XXIII, 273).

Male.—Length, 7.3 to 7.8 mm. Coloration not as variable as in female. Antenna black with apical four segments white. Head black with clypeus and mouthparts except apex of each mandible white. Thorax black with posterior margin of pronotum, tegulae, sometimes V-shaped mark on mesoprescutum, mesoscutellum, and metascutellum white. Legs orange to rufous with each coxa white at apex and black basally. Abdomen normally orange with basal plates and apical two or three segments black, sometimes entire abdomen infuscated. Structure similar to that of female. Hind-wing with peripheral vein. Parapenis of genitalia with narrow apical lobe; penis valve broad, head rectangular with small dorso-apical lobe and dorsoapical margin serrated (pl. XXIV, 281, 282).

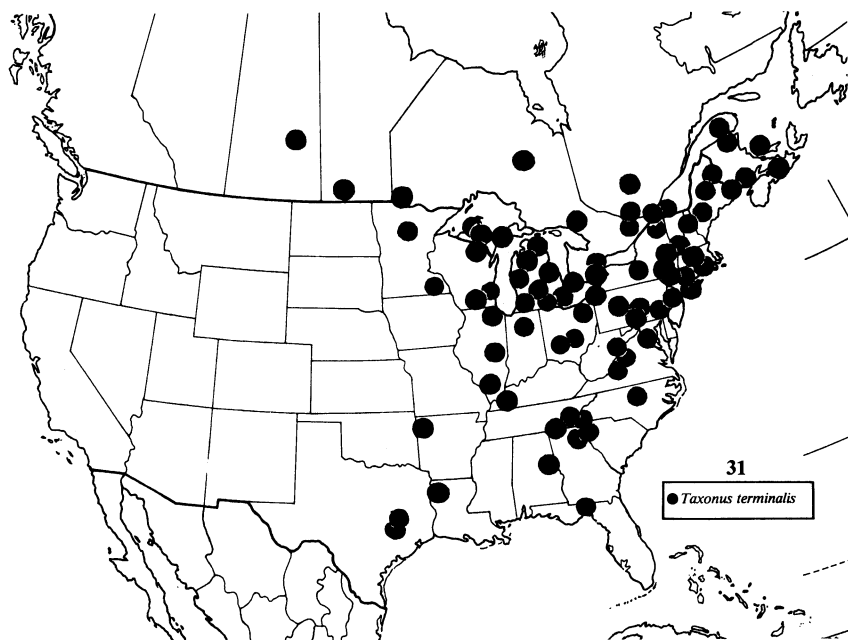
Larva.—I have seen only poorly preserved specimens, but the coloration of these is similar to that described by Dyar (1895c): Head amber with brownish spot on vertex and eyespot and apex of each mandible black; body grayish dorsally, extending laterally to spiracles; a brownish spot on each segment below spiracles. Shed skins of early instars have two brown spots on vertex and one behind each eye, and in the later instars the subspiracular spots are vague. Structural features and mandibles appear to be similar to those described for the larva of *pallicoxus*. The left mandible of the prepupa, however, has three teeth as opposed to four in *pallicoxus*.

Holotypes.—Say's types are lost. Norton's types are at the Museum of Comparative Zoology, Harvard University: *A. abdominalis*, ♂, "Ct." "type No. 14004"; *A. mellosus*, ♀, "Ct." "type 14003." MacGillivray's types are at the Illinois Natural History Survey: *S. rufoculus*, ♀, "Ithaca, N.Y., 5 June '90"; *S. confusa*, ♀, "June 22, '97, W. Springfield, Mass."; *S. shermani*, ♀, "Henderson, N.C., June, 1907, F. Sherman."

Distribution.—Eastern North America (fig. 31): Nova Scotia, Prince Edward Island, New Brunswick, Quebec, Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, Ontario, New York, New Jersey, Pennsylvania, Maryland, District of Columbia, Virginia, North Carolina, South Carolina, Georgia, Florida, Ohio, West Virginia, Kentucky, Tennessee, Alabama, Michigan, Indiana, Wisconsin, Illinois, Manitoba, Minnesota, Arkansas, Louisiana, Saskatchewan, Texas.

Host.—*Rubus* sp.

Biology.—Dyar (1895c) reared this species under his code No. "40," but the only biological information he gave was that the



larva "rolls up in a ball and falls off the leaf at the slightest provocation," and that the larva passes the winter in a cell in the ground. Three adults were reared from larvae feeding on *Rubus* at Falls Church, Va., the rearing bearing Hopkins' No. 10783^g. The larvae were collected July 11, 1921, when found feeding on the underside of the leaves. On August 2 and 12 of the same year, adults emerged. Collection dates of adults range from the first of May to the first of September.

Discussion.—This species shows extreme color variation from an almost entirely orange to reddish-brown head and thorax to nearly entirely black. There are innumerable intermediate color forms and the lack of structural characters to separate them is the reason for my treatment of them as the same species. The name *mellosus* has been applied to those specimens with a black head and reddish-brown orbits; however, I believe this represents an intermediate between the two extremes mentioned here. Two species are close to *terminalis*, both of which have two subbasal teeth on the left mandible and white apical antennal segments. Of these two, *pallidicornis* is separated by the white orbits, and *spiculatus* is separated by the black hindfemur and the head that is much narrower behind the eyes in dorsal view.

Unplaced Species of Allantinae

Emphytus platycerus Say, 1836, p. 220; LeConte, 1859, p. 680; Norton, 1861, p. 157; Norton, 1867, p. 232; Ross, 1951, p. 82.

Harpiphorus platycerus: Dalla Torre, 1894, p. 154.

"*E. platycerus* – Black; tibia and tarsi white; first and second joints of the antennae short, equal. Inhabits Indiana.

Body short, robust, black, polished; antenna rather robust, compressed, first and second joints remarkably short, when taken together less than half the length of either of the others; remaining joints subequal, the third hardly longest; mouth dull piceous; wing scale dull piceous; wings fuliginosus, with a violaceous tinge; feet white; thighs in the middle and coxae black.

Length less than $\frac{3}{20}$ of an inch.

The joints of the antennae are shorter and more compressed than those of any other species I have seen."

The combination of color, compressed short antennae, and small size do not fit any Allantinae known to me. Possibly this represents a species in the Heterarthrinae. Even though Say described it in *Emphytus*, it will have to remain a nomen dubium in the category of unplaced species of Tenthredinidae.

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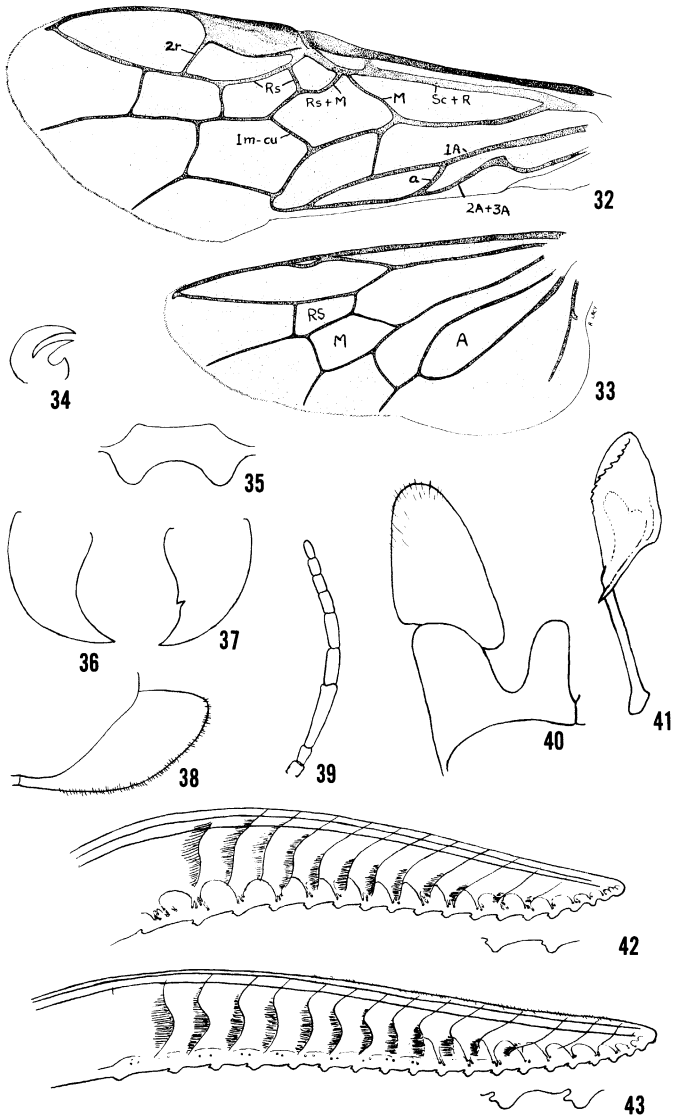
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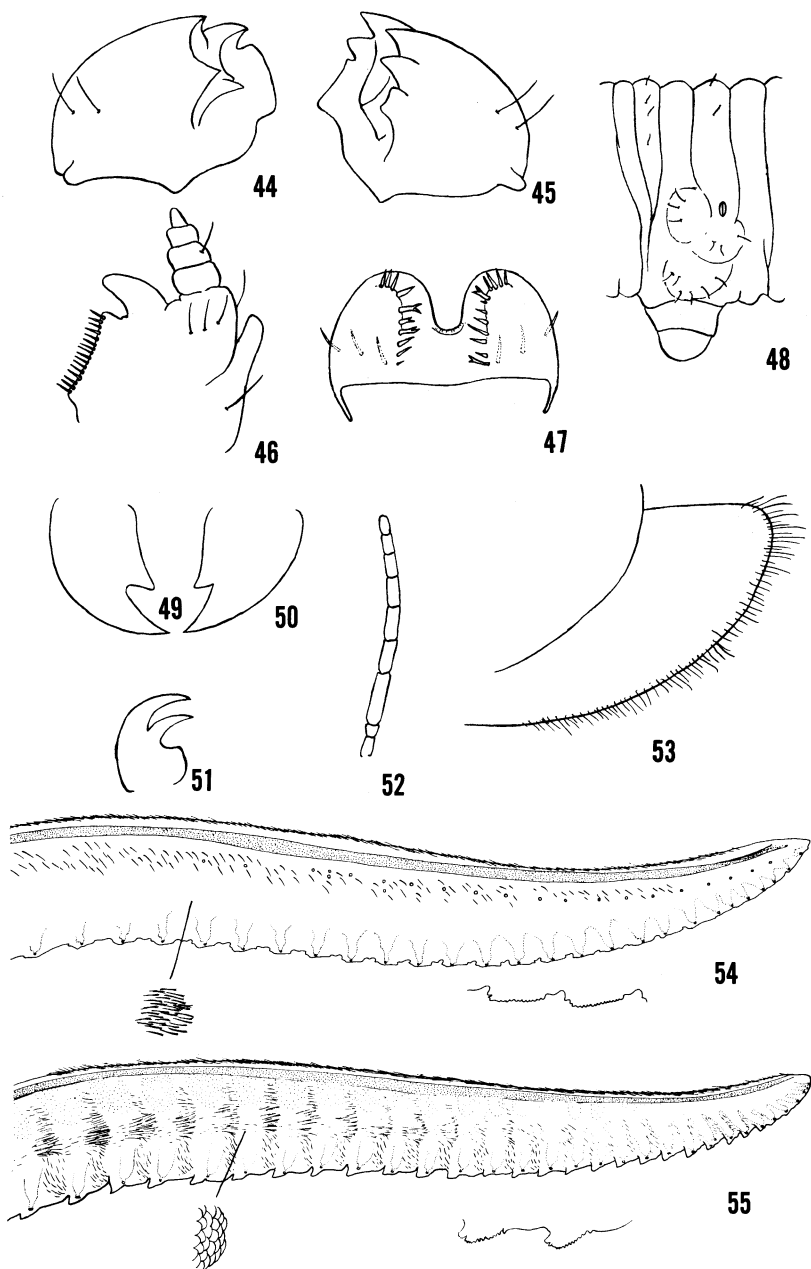
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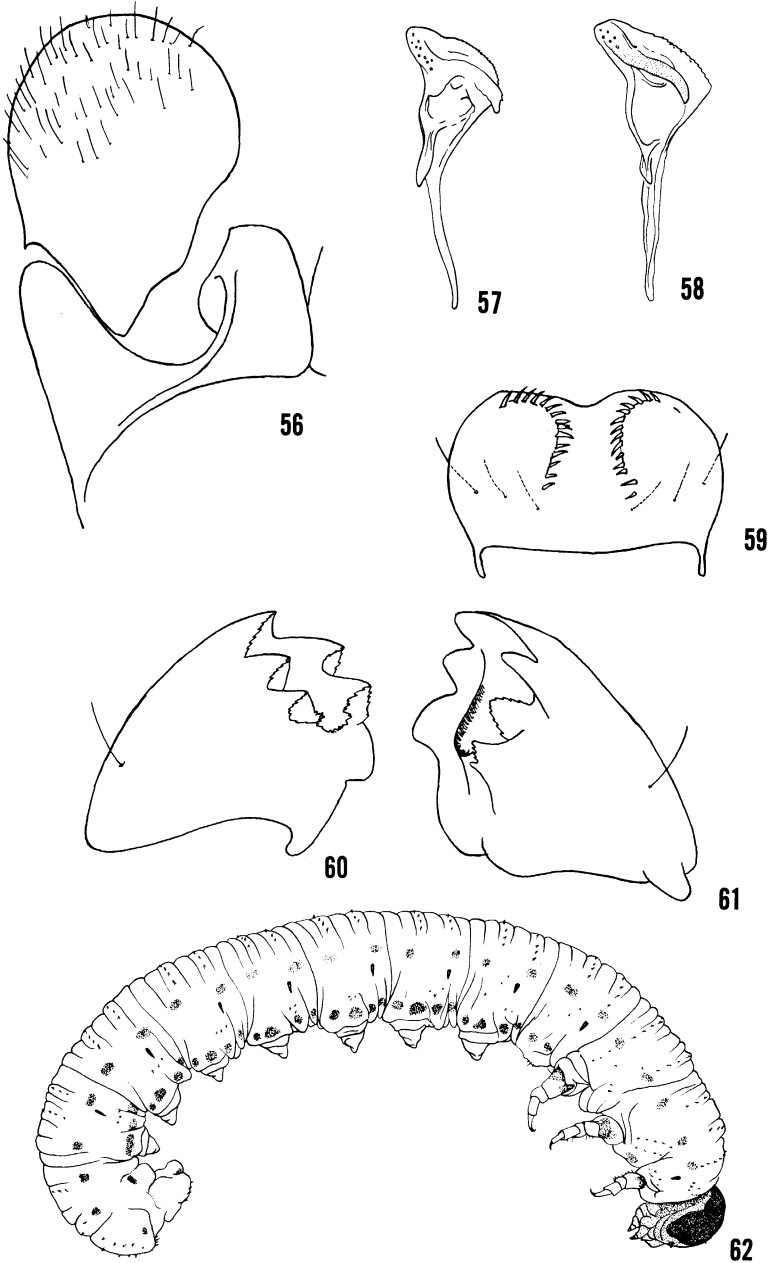
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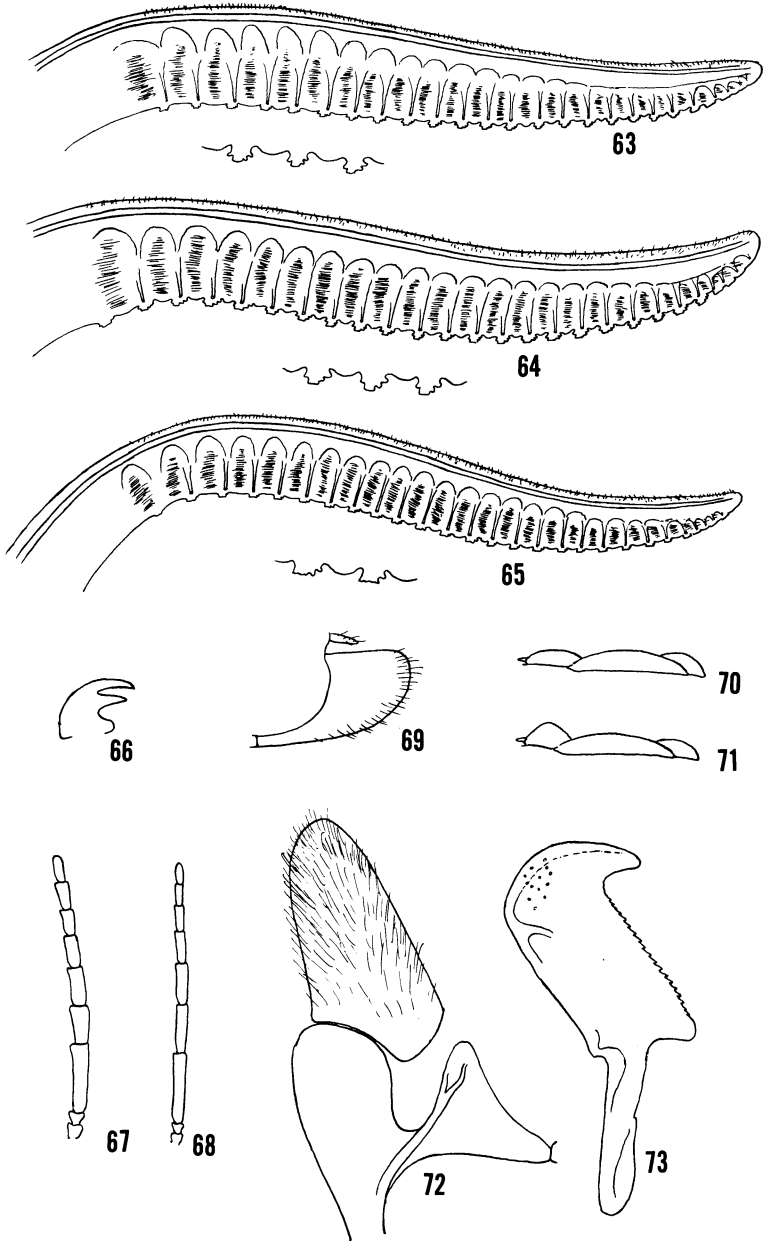
Eriocampa juglandis: Forewing (32), hindwing (33), tarsal claw (34), clypeus (35), right mandible (36), left mandible (37), female sheath (38), antenna (39), male harpe and parapenis (40), male penis valve (41), female lancet (42); *E. ovata* female lancet (43). [A = anal cell; 1A, 2A, 3A = 1st, 2d, and 3d anal veins; a = anal crossvein; M = media, medial cell; 1m-cu = mediocubital crossvein; 2r = 2d radial crossvein; RS = radial sector cell; Rs = radial sector; Rs + M = radial sector and media; Sc + R = subcosta and radius]



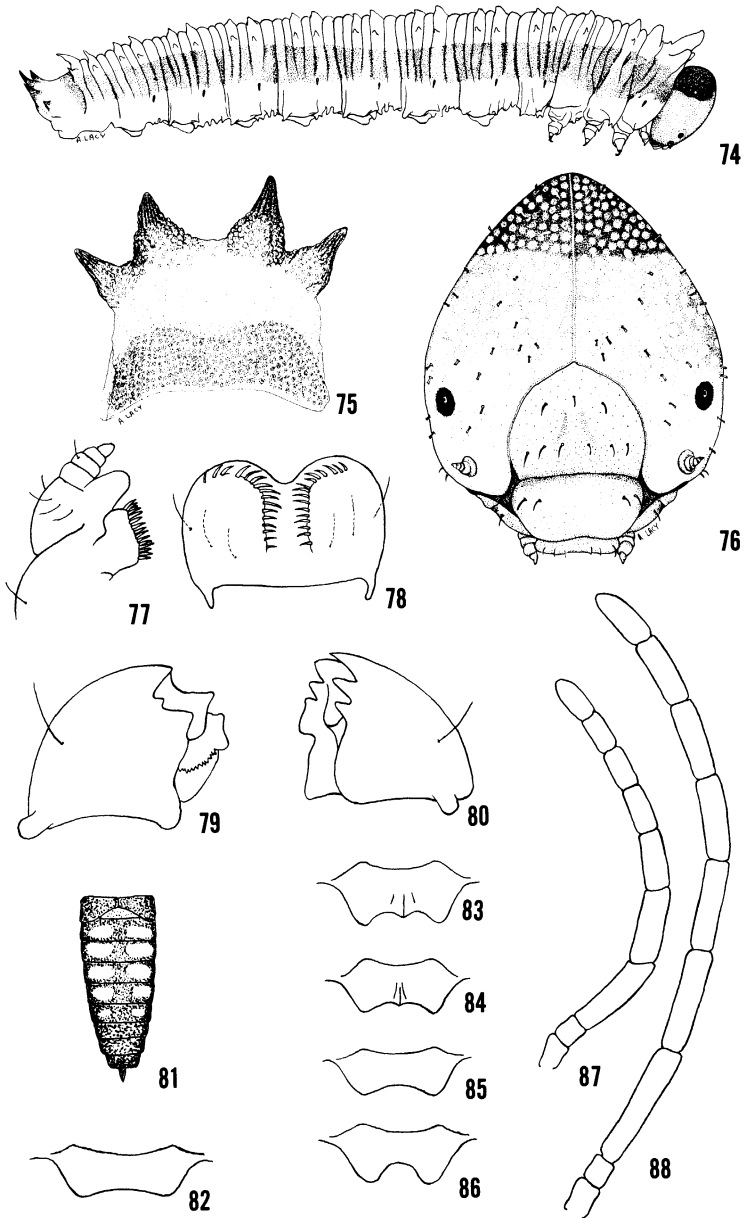
Eriocampa juglandis larva: Right mandible, ventral (44), left mandible, ventral (45), maxilla (46), epipharynx (47), 3d abdominal segment (48). *Pseudosiobla excavata*: Right mandible (49), left mandible (50), tarsal claw (51), antenna (52), female sheath (53), female lancet (54); *P. cephalanthi* female lancet (55).



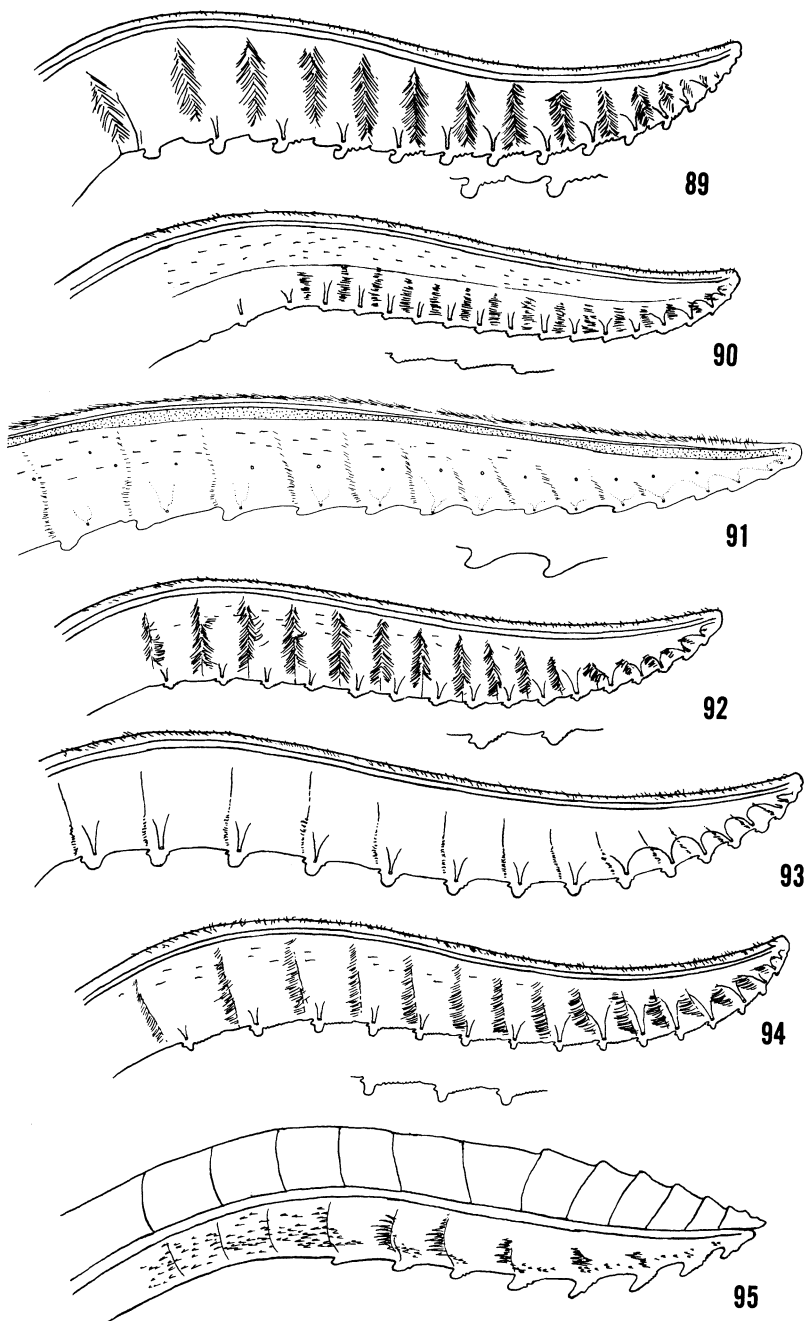
Pseudosiobla excavata male harpe and parapenis (56), male penis valve (57); *P. cephalanthi* male penis valve (58); *P. excavata* larva: Epipharynx (59), right mandible, ventral (60), left mandible, ventral (61), entire larva, lateral (62).



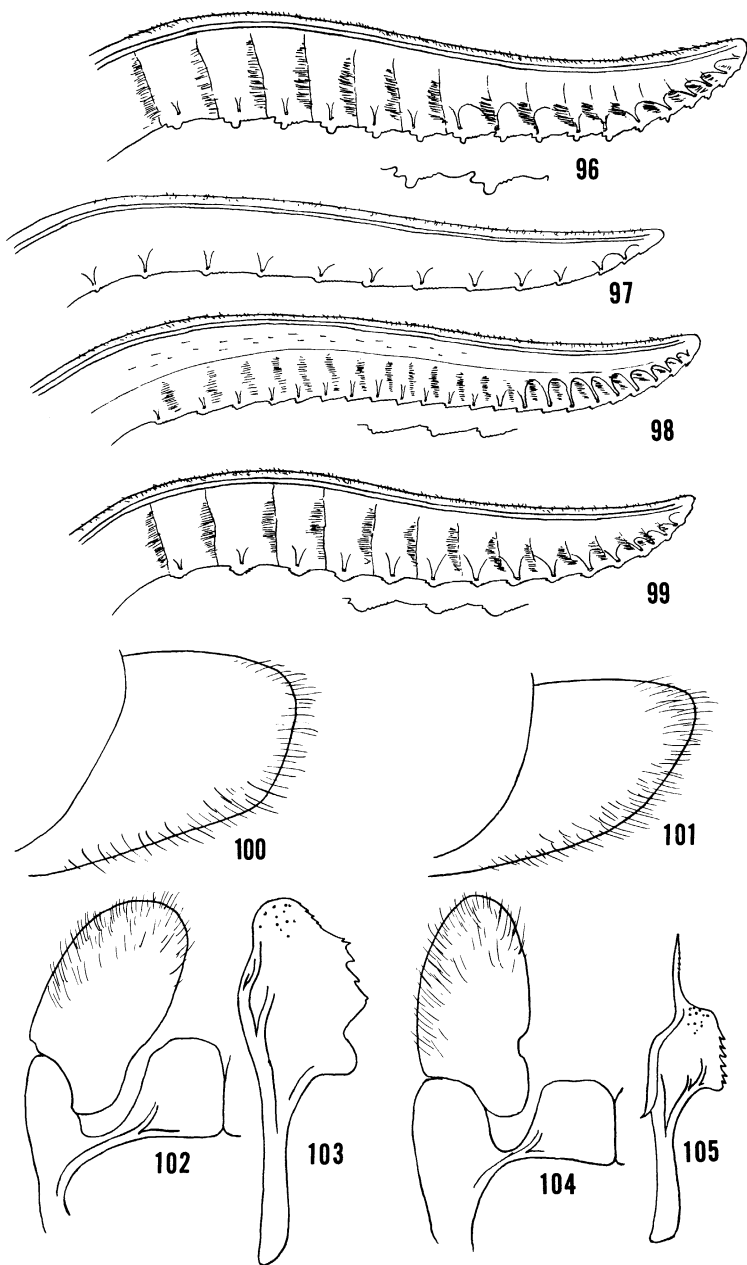
Female lancet: *Dimorphopteryx pinguis* (63), *D. melanognathus* (64), *D. virginicus* (65); *D. pinguis*: Tarsal claw (66), antenna (67); *D. melanognathus* antenna (68); *D. pinguis*: Female sheath (69), profile of mesonotum (70); *D. abnormalis* profile of mesonotum (71); *D. melanognathus*: Male harpe and parapenis (72), male penis valve (73).



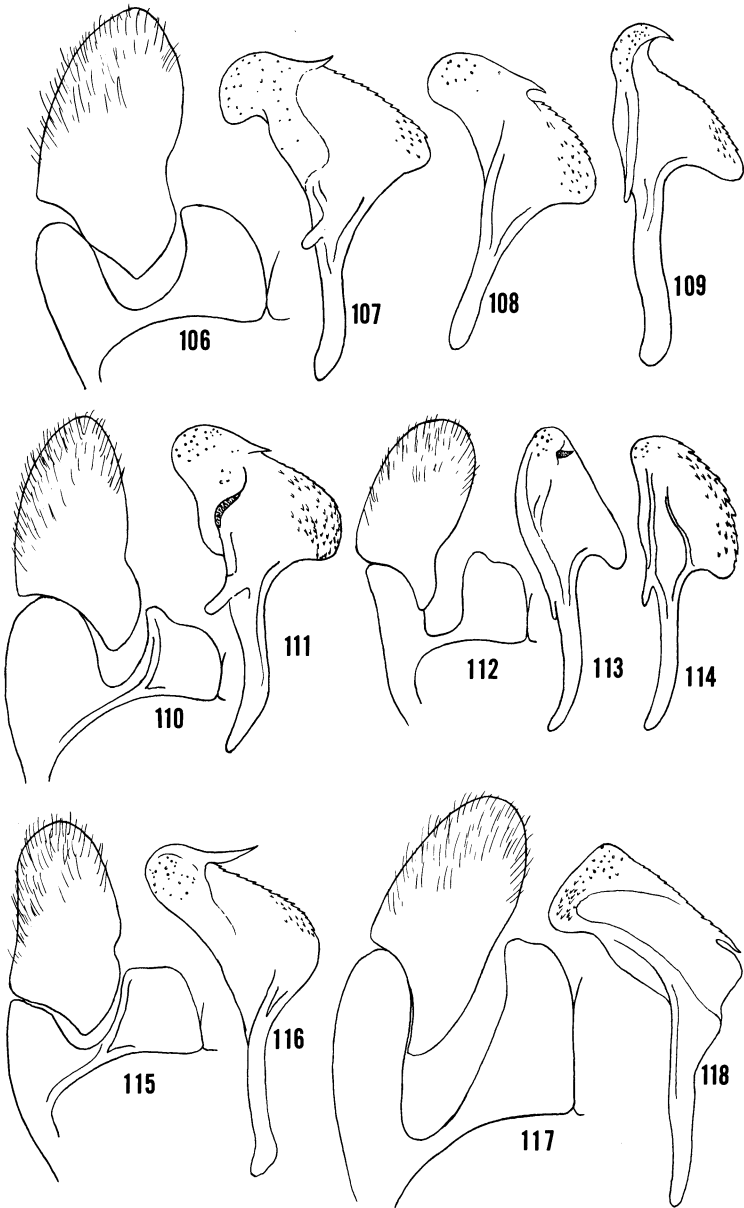
Dimorphopteryx virginicus larva: Entire larva, lateral (74), 10th tergum, dorsal (75), head, frontal (76), maxilla (77), epipharynx (78), right mandible, ventral (79), left mandible, ventral (80). *Empria maculata* abdomen, dorsal (81); clypeus: *E. coryli* (82), *E. improba* (83), *E. obscurata* (84), *E. candidata* (85), *E. multicolor* (86); antenna: *E. obscurata* (87), *E. eosa* (88).



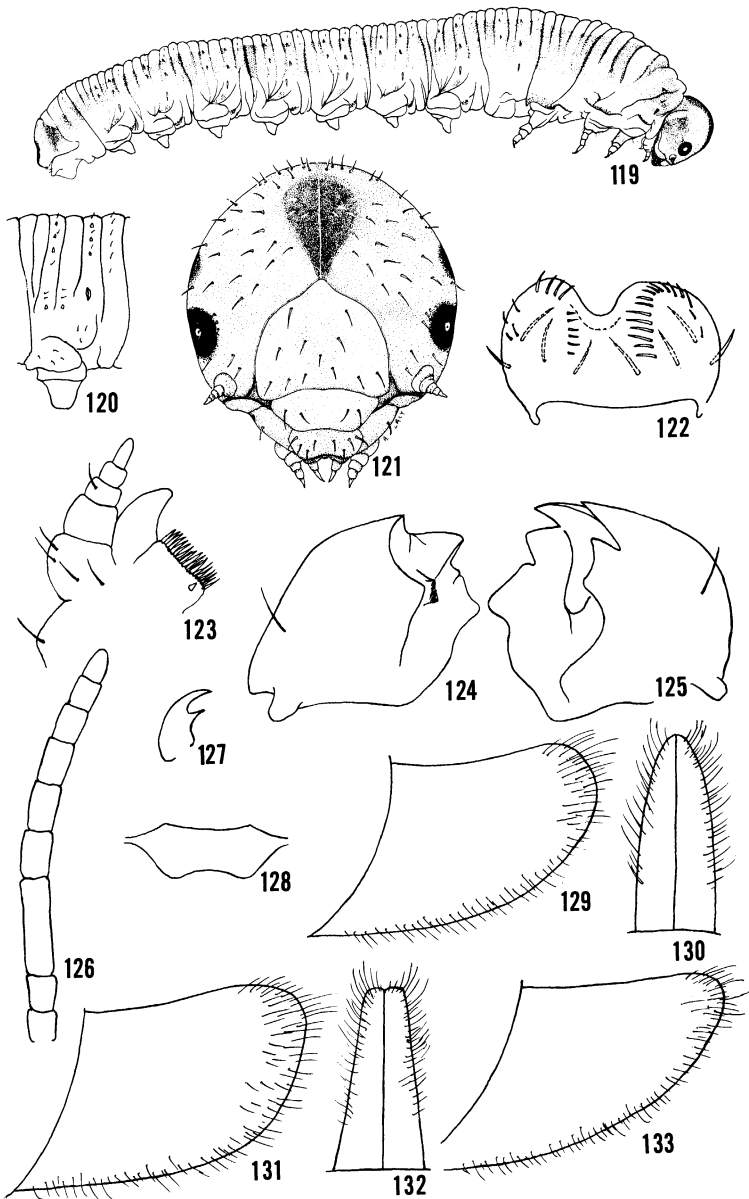
Female lancet: *Empria alpina* (89), *E. candidata* (90), *E. coryli* (91), *E. eosa* (92), *E. ignota* (93), *E. improba* (94), *E. maculata*, also showing lance (95).



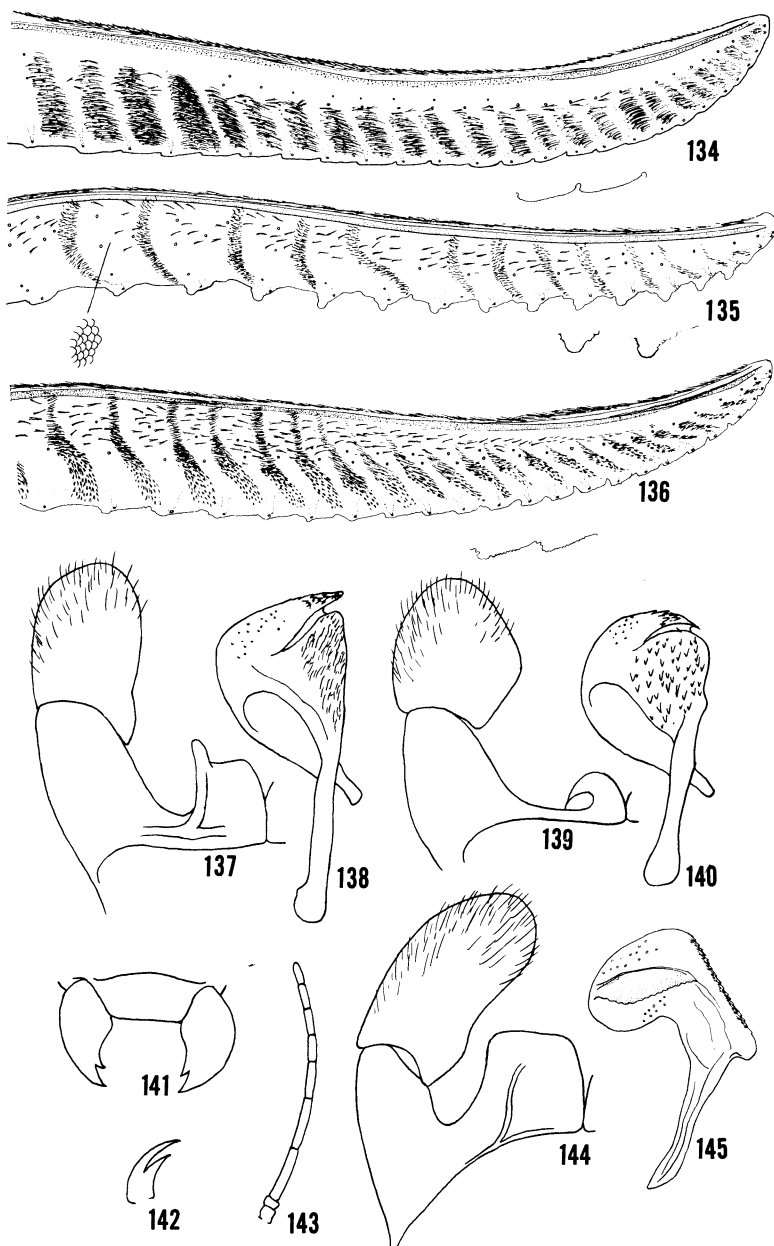
Female lancet: *Empria mexicana* (96), *E. nordica* (97), *E. multicolor* (98), *E. obscurata* (99); female sheath: *E. maculata* (100), *E. obscurata* (101); male genitalia: Harpe and parapenis (102) and penis valve (103) of *E. coryli*, harpe and parapenis (104) and penis valve (105) of *E. improba*.



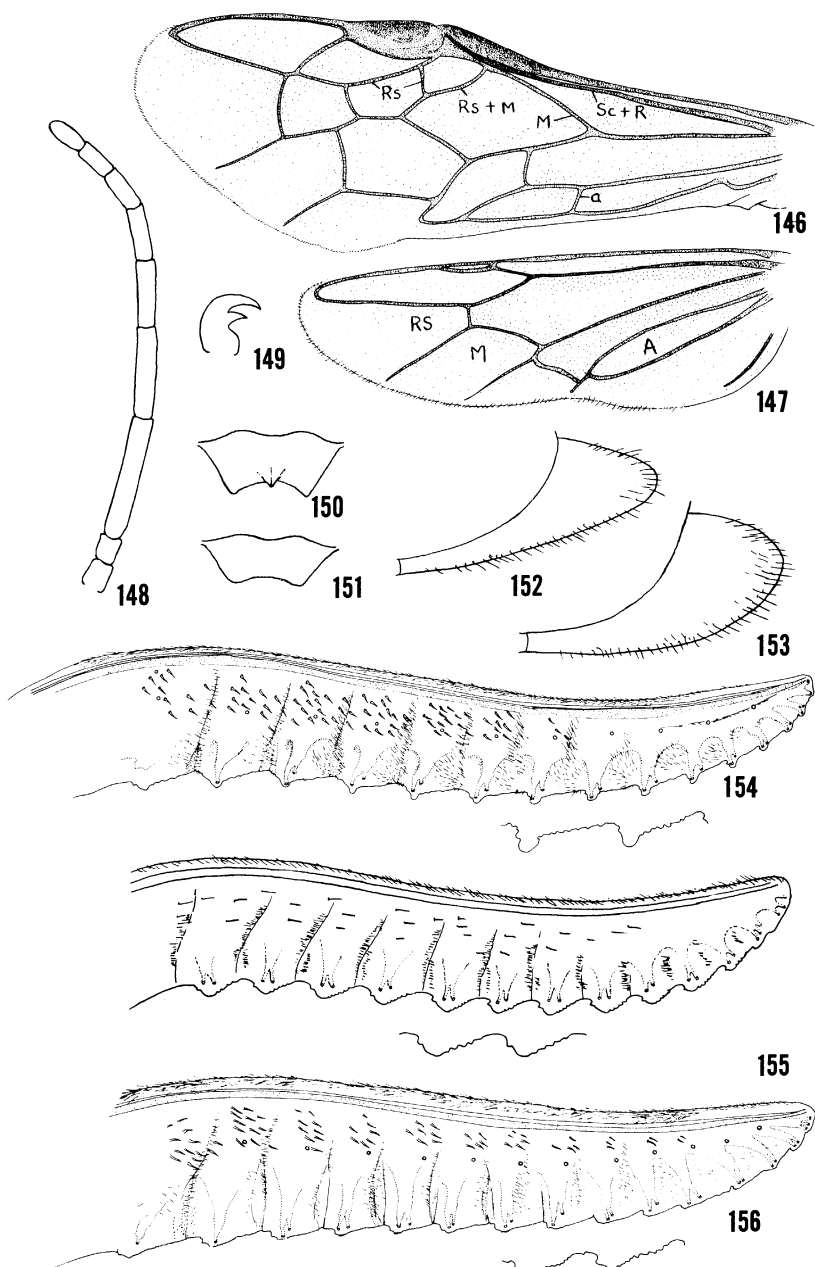
Male genitalia: Harpe and parapenis (106) and penis valve (107) of *Empria obscurata*, penis valve of *E. mexicana* (108) and *E. maculata* (109), harpe and parapenis (110) and penis valve (111) of *E. eosa*, harpe and parapenis (112) and penis valve (113) of *E. multicolor*, penis valve of *E. alpina* (114), harpe and parapenis (115) and penis valve (116) of *E. ignota*, harpe and parapenis (117) and penis valve (118) of *E. candidata*.



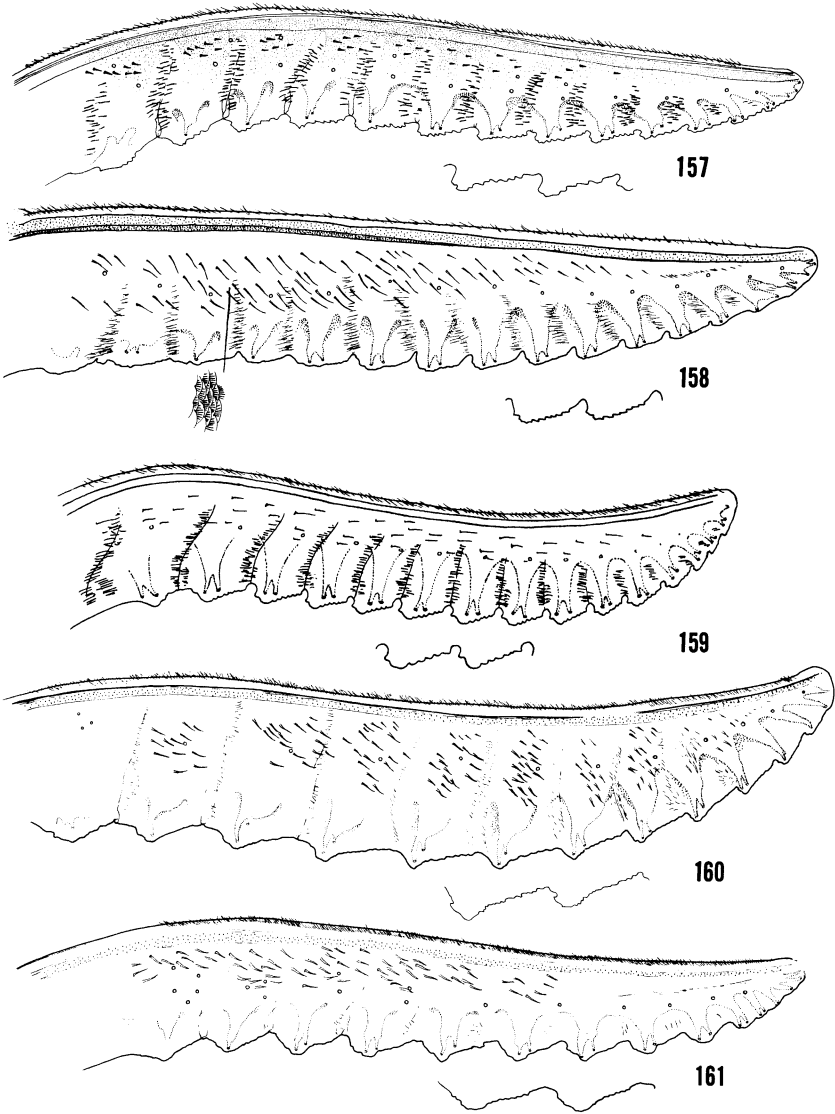
Empria multicolor entire larva, lateral (119); *E. maculata* larva: 3d abdominal segment (120), head, front view (121), epipharynx (122), maxilla (123), right mandible, ventral (124), left mandible, ventral (125). *Phrontosoma usta*: Antenna (126), tarsal claw (127), clypeus (128); female sheaths: Lateral (129) and dorsal (130) of *P. belfragei*, lateral (131) and dorsal (132) of *P. usta*, lateral of *P. brocca* (133).



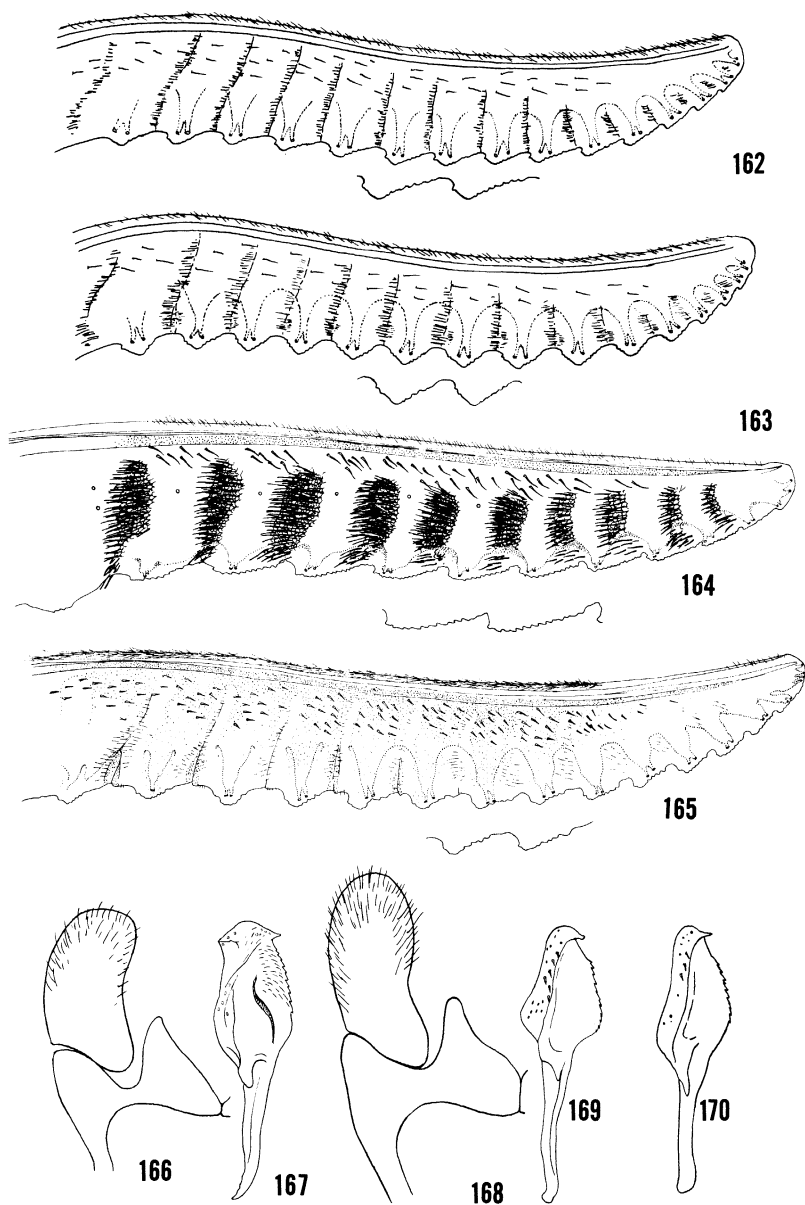
Female lancet: *Phrontosoma belfragei* (134), *P. brocca* (135), *P. usta* (136); male genitalia: Harpe and parapenis (137) and penis valve (138) of *P. usta*, harpe and parapenis (139) and penis valve (140) of *P. belfragei*. *Haymatus blassus*: Mandibles and clypeus (141), tarsal claw (142), antenna (143), harpe and parapenis (144), penis valve (145).



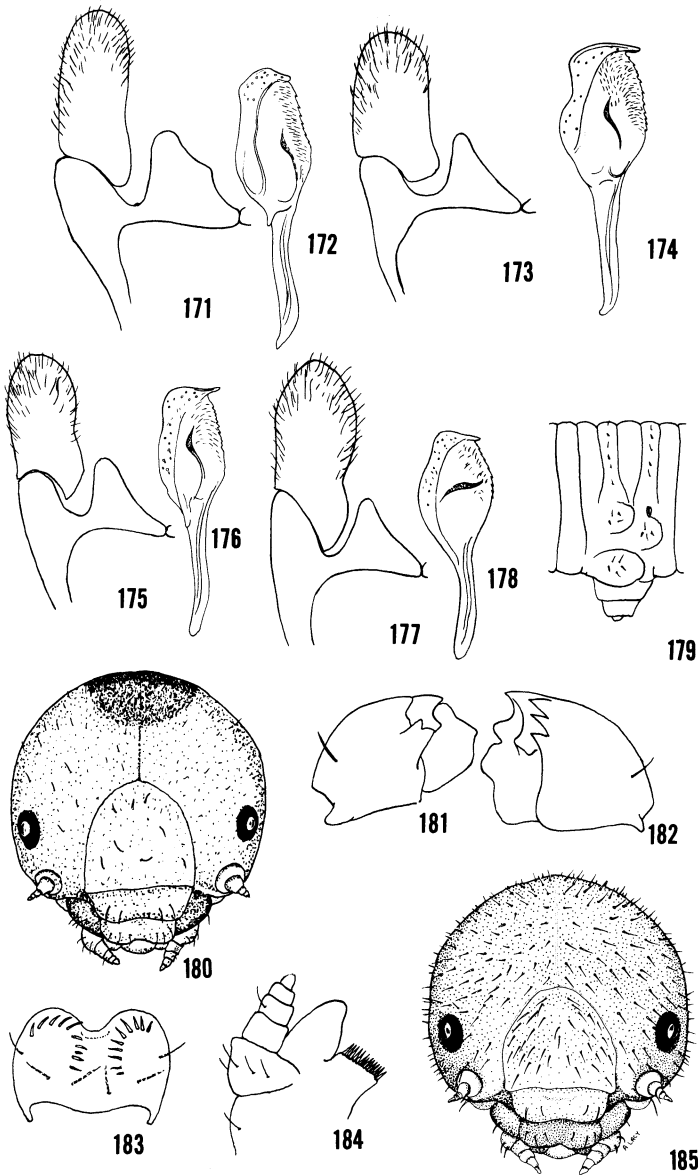
Ametastegia glabrata: Forewing (146), hindwing (147), antenna (148), tarsal claw (149); clypeus: *A. tener* (150), *A. coloradensis* (151); sheath: *A. tener* (152), *A. coloradensis* (153); female lancet: *A. aperta* (154), *A. articulata* (155), *A. becria* (156). [For explanation of wing letters, see plate I legend.]



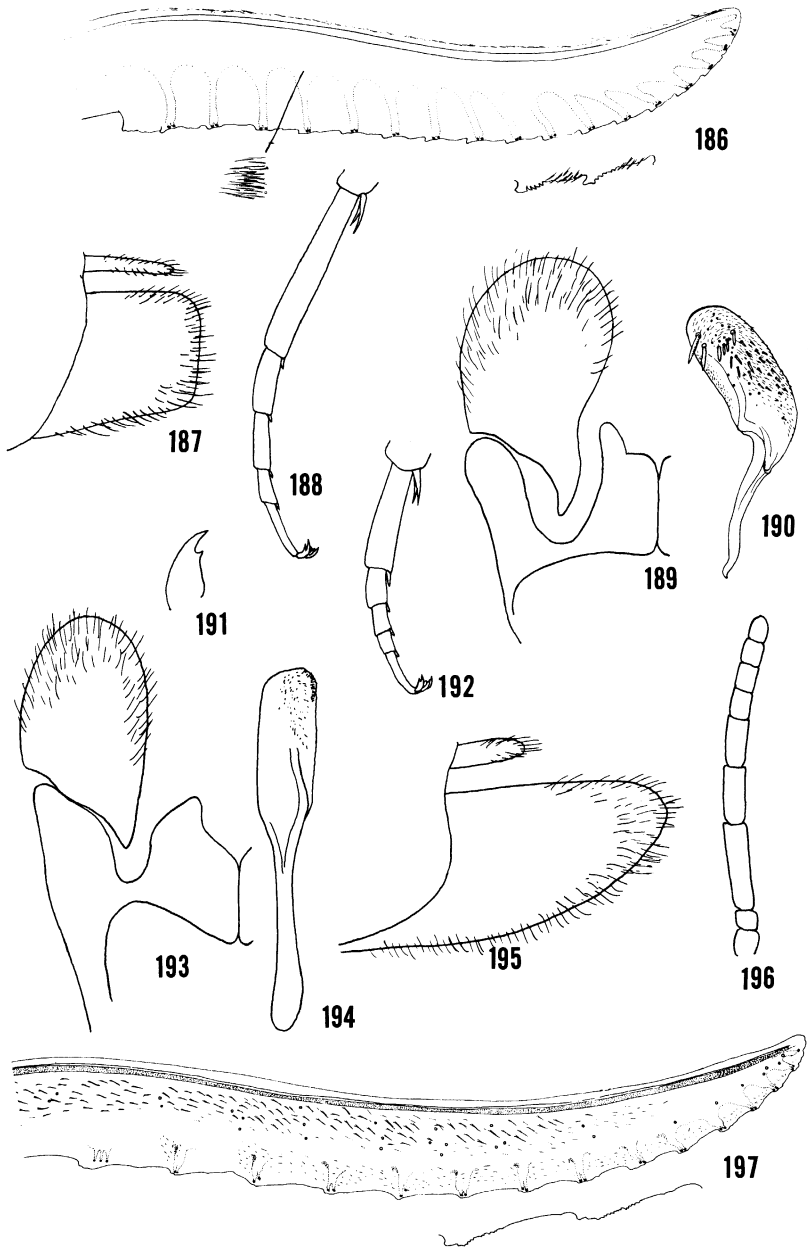
Female lancet: *Ametastegia coloradensis* (157), *A. glabrata* (158), *A. mexicana* (159), *A. pallipes* (160), *A. pulchella* (161).



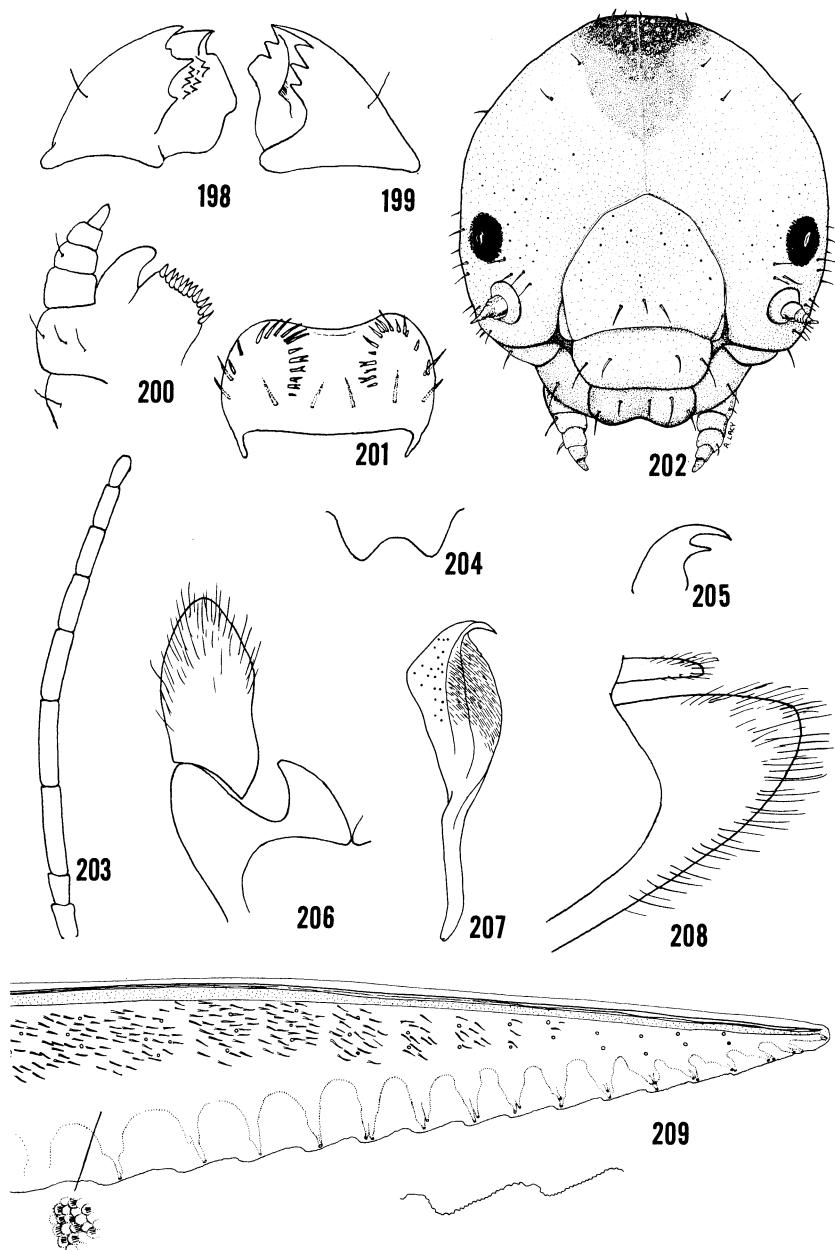
Female lancet: *Ametastegia recens* (162), *A. rocia* (163), *A. tener* (164), *A. xenia* (165); male genitalia: Harpe and parapenis (166) and penis valve (167) of *A. articulata*, harpe and parapenis (168) and penis valve (169) of *A. glabrata*, penis valve of *A. equiseti* (170).



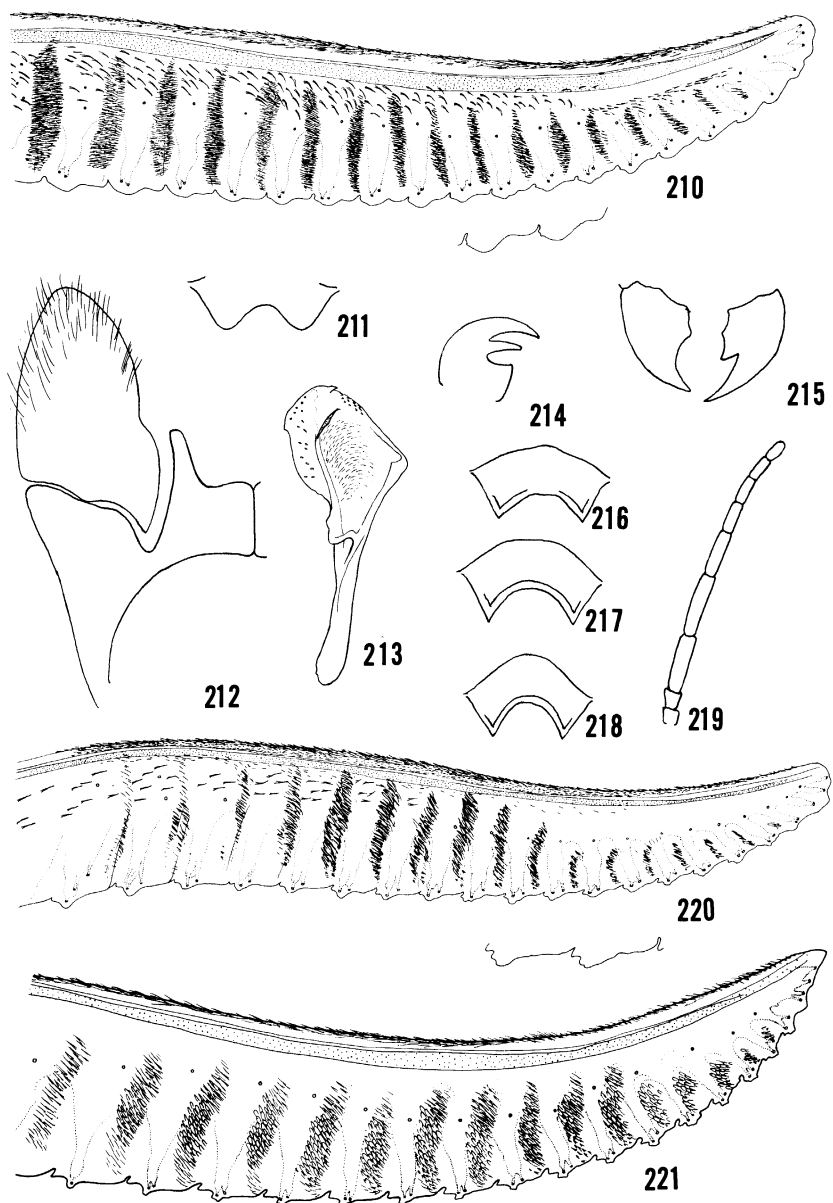
Male genitalia: Harpe and parapenis (171) and penis valve (172) of *Ameletastegia championi*, harpe and parapenis (173) and penis valve (174) of *A. coloradensis*, harpe and parapenis (175) and penis valve (176) of *A. mexicana*, harpe and parapenis (177) and penis valve (178) of *A. tener*; *A. articulata* larva: 3d abdominal segment (179), front view of head (180), right mandible, ventral (181), left mandible, ventral (182), epipharynx (183), maxilla (184); *A. pallipes* larva, front view of head (185).



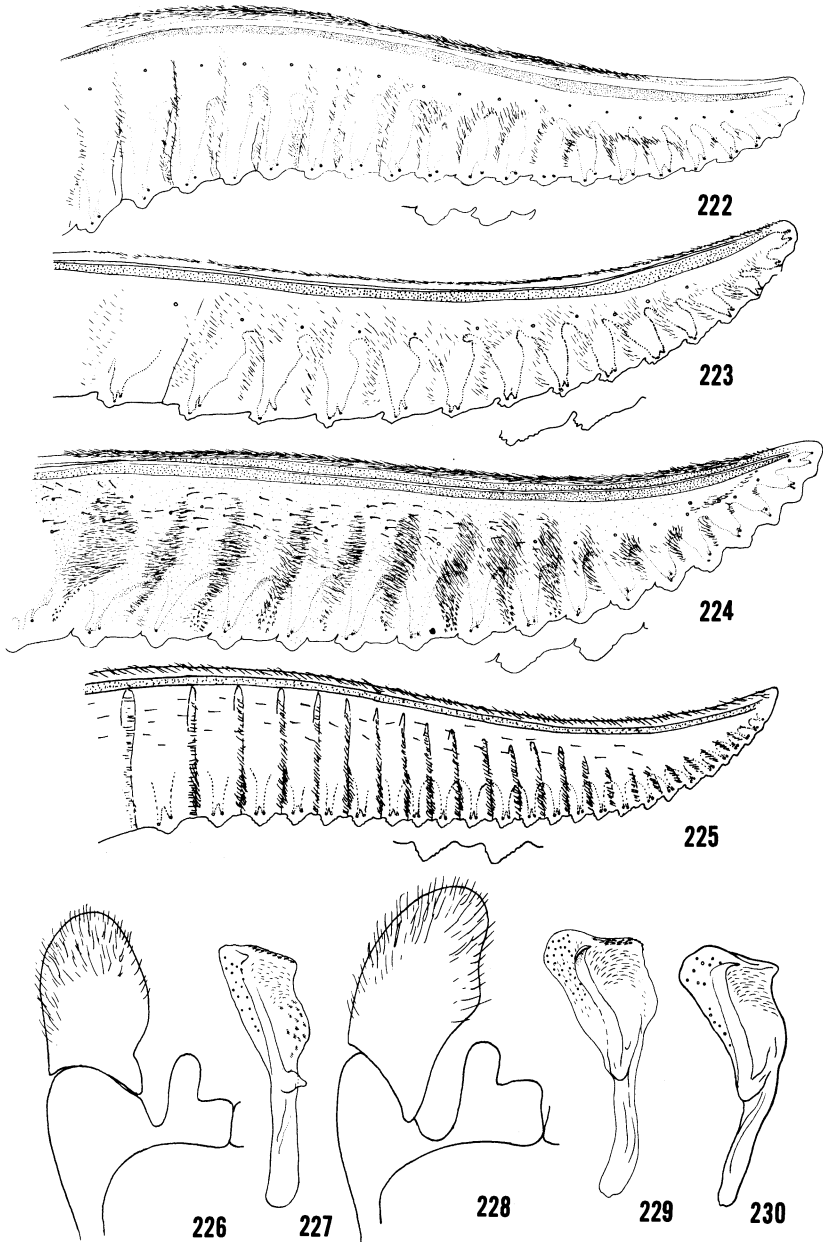
Monosoma inferentia: Female lancet (186), female sheath (187), hindtarsus of female (188), male harpe and parapenis (189), male penis valve (190). *Monostegia abdominalis*: Tarsal claw (191), hindtarsus of female (192), male harpe and parapenis (193), male penis valve (194), female sheath (195), antenna (196), female lancet (197).



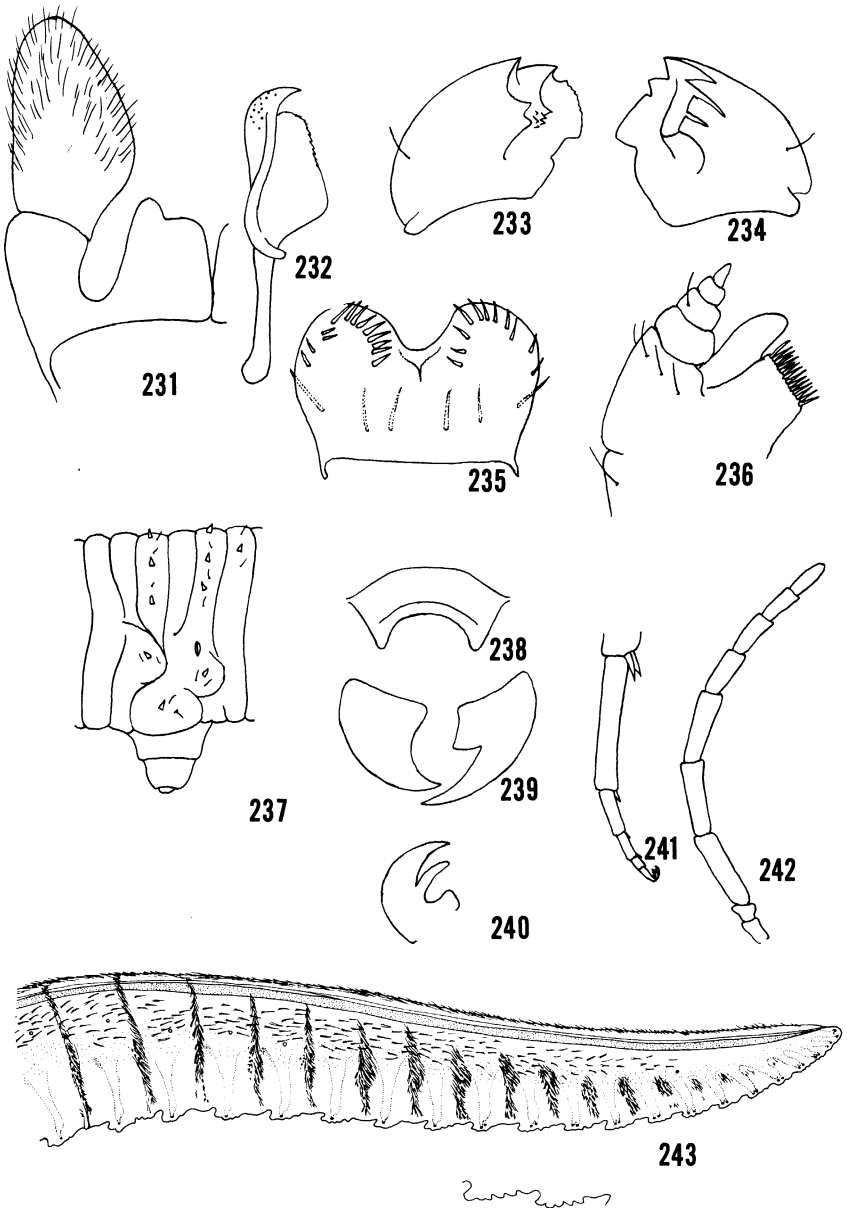
Monostegia abdominalis larva: Right mandible, ventral (198), left mandible, ventral (199), maxilla (200), epipharynx (201), front view of head (202). *Somanica occua*: Antenna (203), clypeus (204), tarsal claw (205), male harpe and parapenis (206), male penis valve (207), female penis sheath (208), female lancet (209).



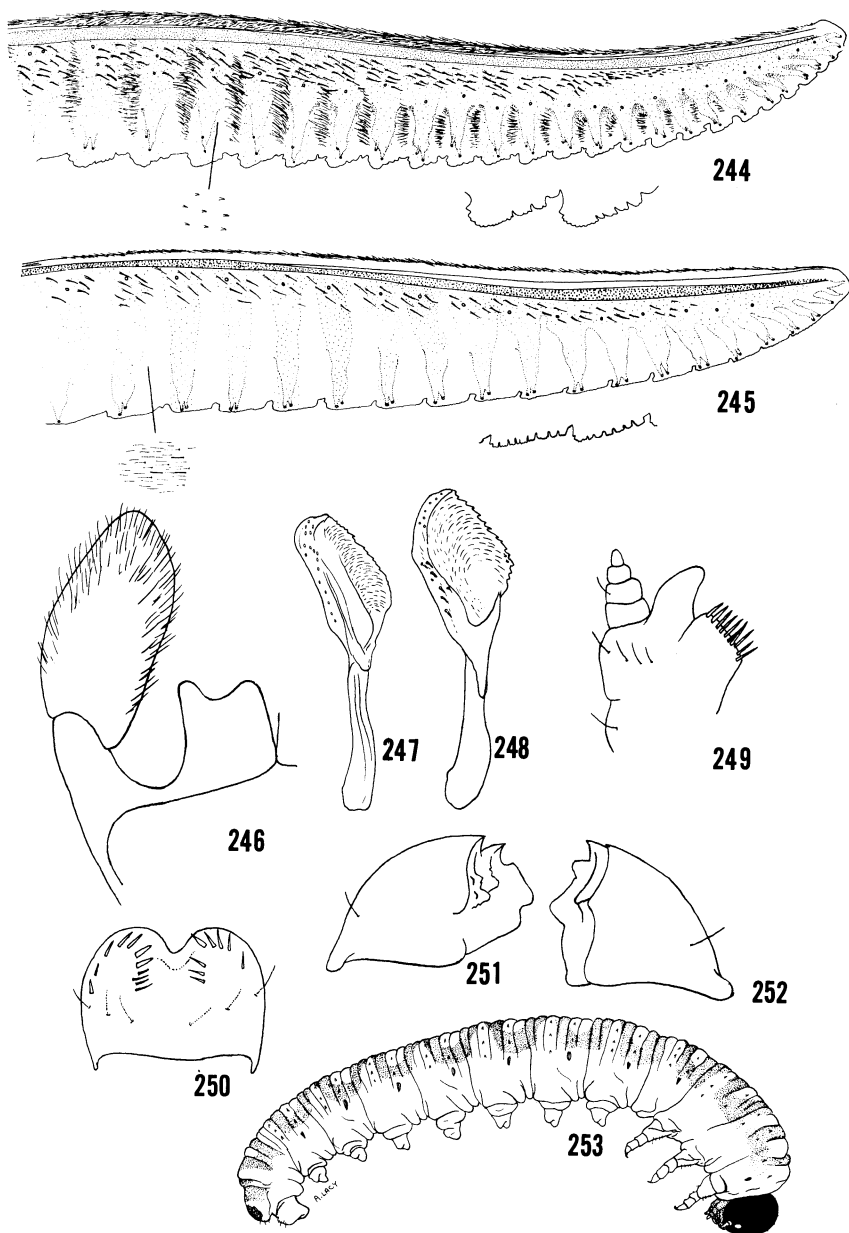
Aphilodactylum fidum: Female lancet (210), clypeus (211), male harpe and parapenis (212), male penis valve (213). *Allantus cinctus*: Tarsal claw (214), mandibles (215); clypeus: *Allantus umbonatus* (216), *A. basalis* (217), *A. cinctus* (218); *A. cinctus* antenna (219); female lancet: *A. basalis* (220), *A. cinctus* (221).



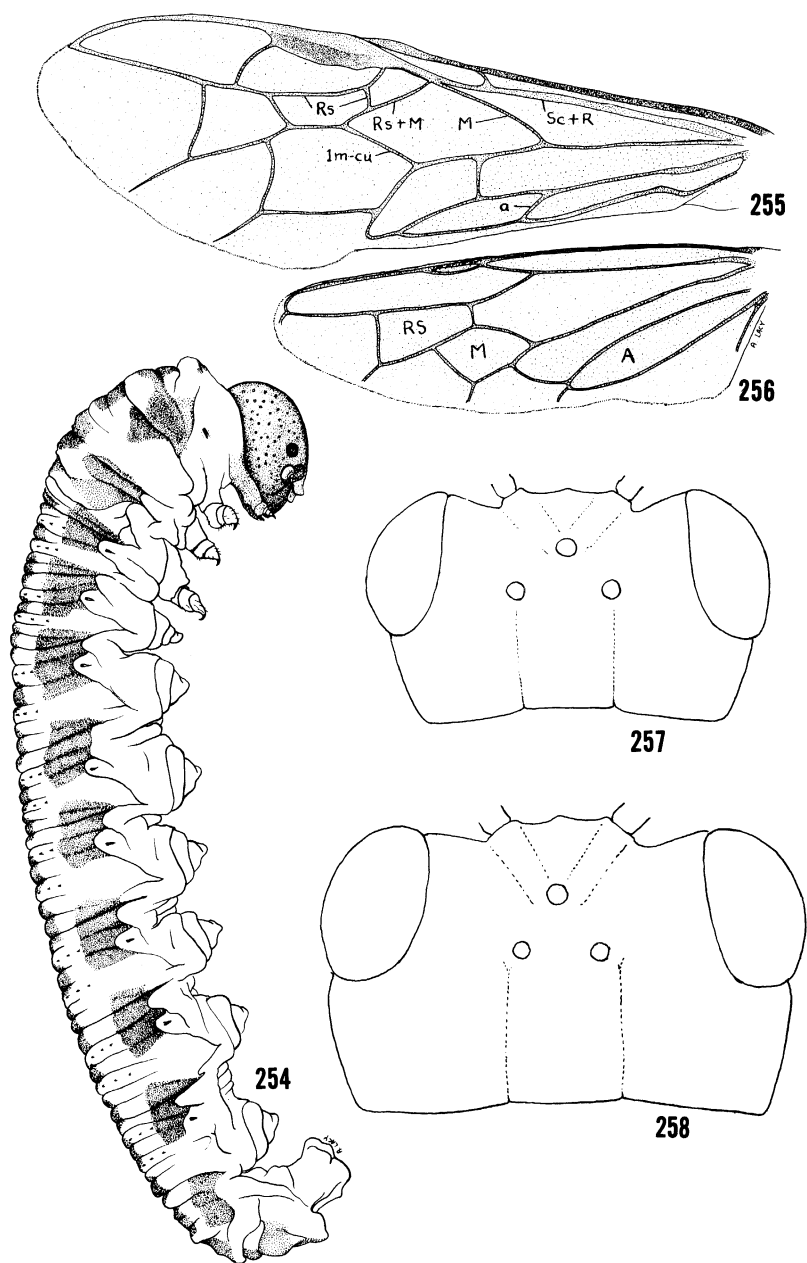
Female lancet: *Allantus mellipes* (222), *A. rahmus* (223), *A. umbonatus* (224), *A. viennensis* (225); male genitalia: Harpe and parapenis (226) and penis valve (227) of *A. cinctus*, harpe and parapenis (228) and penis valve (229) of *A. mellipes*, penis valve of *A. rahmus* (230).



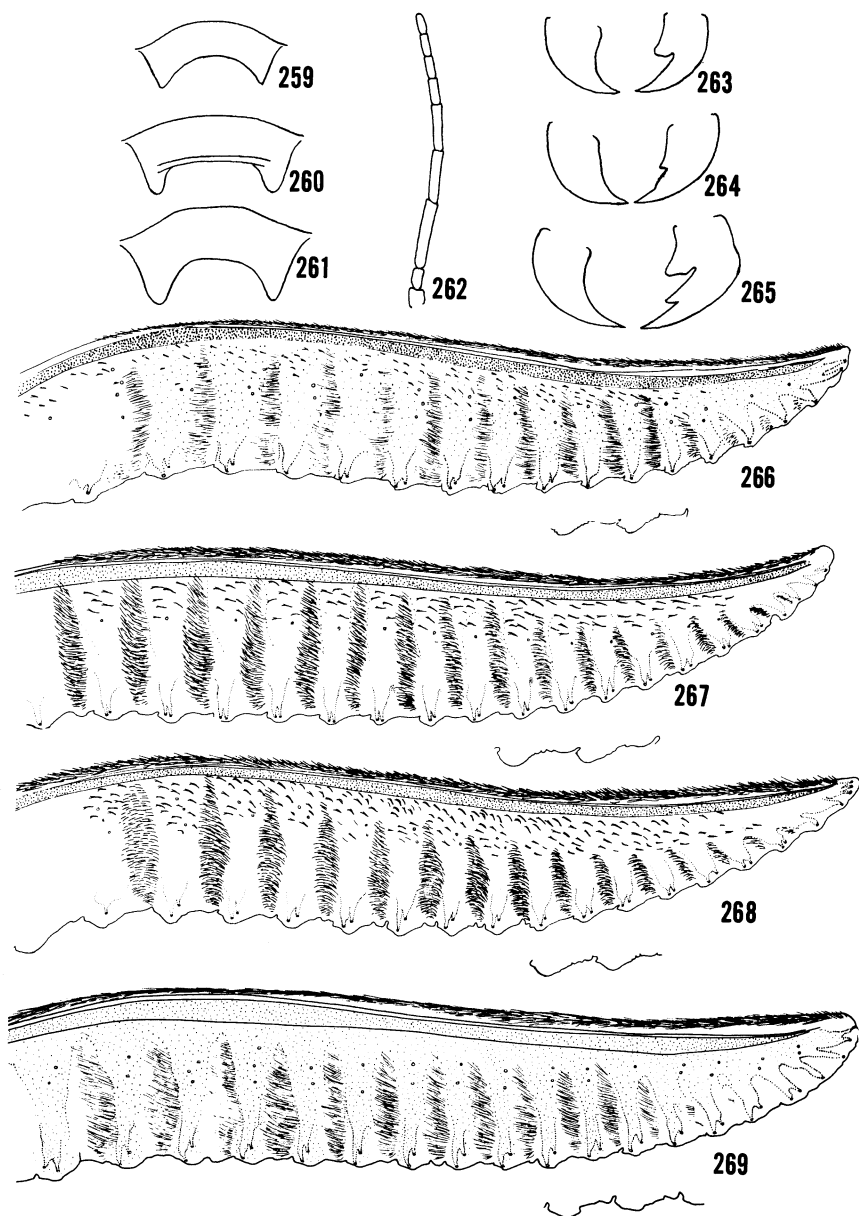
Male harpe and parapenis (231) and penis valve (232) of *Allantus viennensis*; *A. cinctus* larva: Right mandible, ventral (233), left mandible, ventral (234), epipharynx (235), maxilla (236), 3d abdominal segment (237). *Macremphytus testaceus*: Clypeus (238), mandibles (239), tarsal claw (240), hindtarsus (241), antenna (242); *M. semicornis* lancet (243).



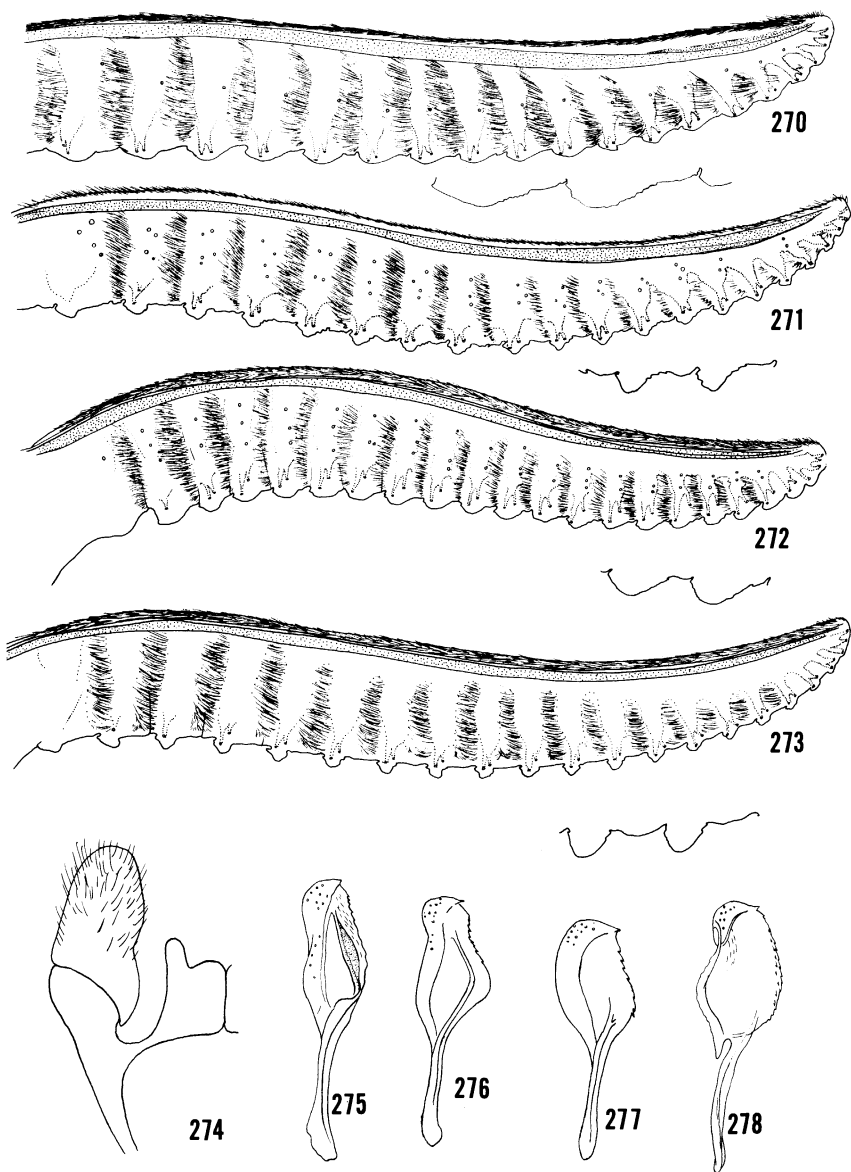
Female lancet: *Macremphytus tarsatus* (244), *M. testaceus* (245); male genitalia: Harpe and parapenis (246) and penis valve (247) of *M. testaceus*, penis valve of *M. semicornis* (248); *M. tarsatus* larva: Maxilla (249), epipharynx (250), right mandible, ventral (251), left mandible, ventral (252); prepupa, entire (253).



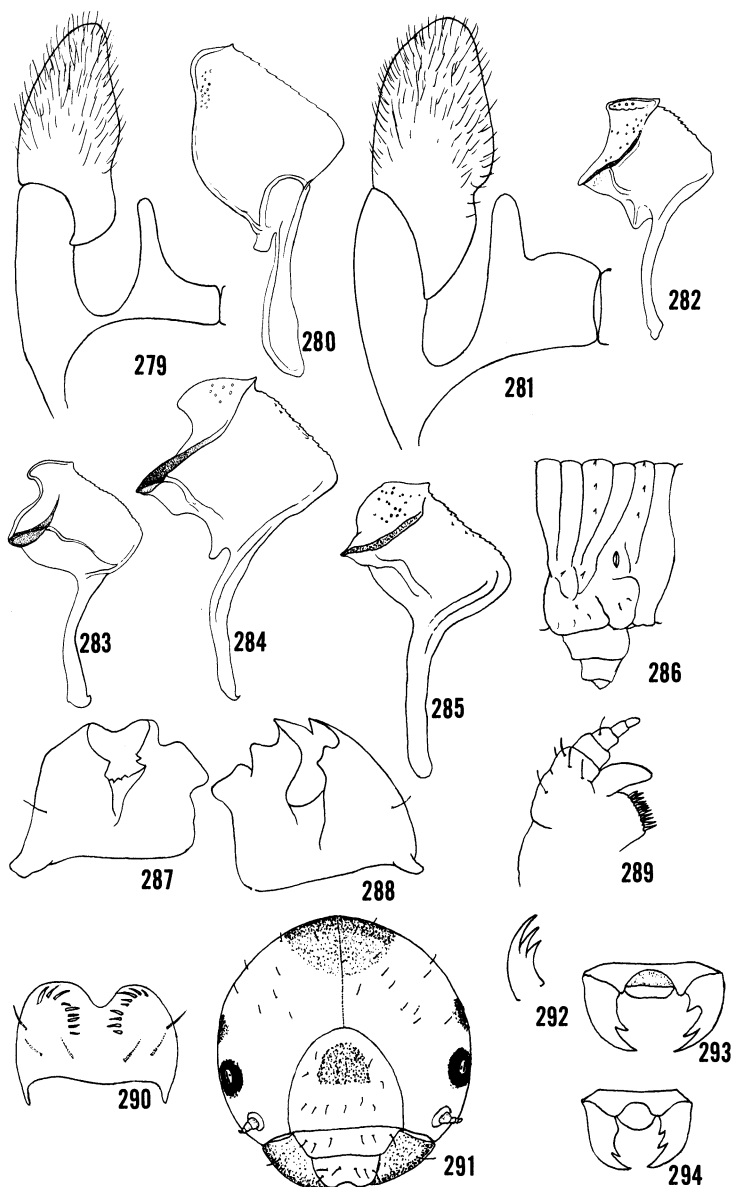
Macremphytus testaceus prepupa, entire (254). Forewing (255) and hindwing (256) of *Taxonus terminalis*; head, dorsal: *T. spiculatus* (257), *T. terminalis* (258). [For explanation of wing letters, see plate I legend.]



Clypeus: *Taxonius pallicoxus* (259), *T. epicera* (260), *T. terminalis* (261);
T. terminalis antenna (262); mandibles: *T. pallicoxus* (263), *T. epicera*
 (264), *T. terminalis* (265); female lancet: *T. borealis* (266), *T. epicera*
 (267), *T. pallicoxus* (268), *T. pallipes* (269).



Female lancet: *Taxonus proximus* (270), *T. rufocinctus* (271), *T. spiculatus* (272), *T. terminalis* (273); male genitalia: Harpe and parapenis (274) and penis valve (275) of *T. pallipes*; penis valve: *T. pallicoxus* (276), *T. borealis* (277), *T. epicera* (278).



Male genitalia: Harpe and parapenis (279), and penis valve (280) of *Taxonus rufocinctus*, harpe and parapenis (281) and penis valve (282) of *T. terminalis*; penis valve: *T. proximus* (283), *T. pallidicornis* (284), *T. spiculatus* (285); *T. pallicoxus* larva: 3d abdominal segment (286), right mandible, ventral (287), left mandible, ventral (288), maxilla (289), epipharynx (290), head, front view (291). *Acidiophora bokoma* tarsal claw (292). Clypeus, labrum, and mandibles: *Probleta* sp. (293), *Proto-probleta* sp. (294).

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